EAST ENGINEERING
LIBRARY

FOOD INDUSTRIES

• FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

Filling hot, pasteurized, concentrated juice

APRIL 1946

Evaluating The Job

Baker and Miller Meet the New Flour

Electronic Heat in Food Industries

Preserving Fruit Juices in Germany

Where Do We Go Nc With Frozen Foods

Technological Advances in Cannin

"Undercooling" Retards Freezing

McGRAW-HILL PUBLICATIO

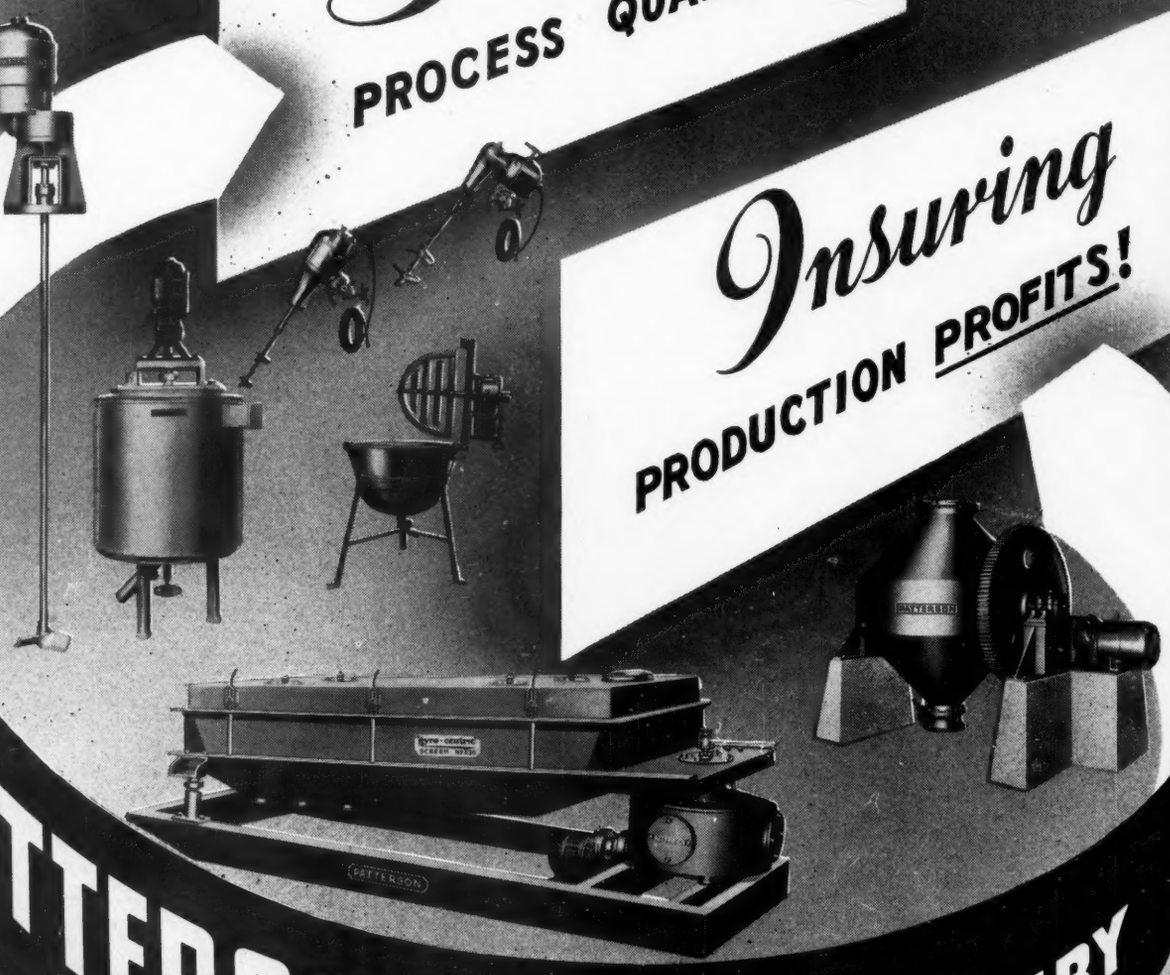
IN TODAY'S FOODS MANUFACTURE.....

Guarding

PROCESS QUALITY

Insuring

PRODUCTION PROFITS!



PATTERSON SATISFACTORY MACHINERY

KETTLES . . . MIXERS . . . BLENDERS
AGITATORS . . . SCREENS

THE PATTERSON FOUNDRY & MACHINE CO.

EAST LIVERPOOL, OHIO, U. S. A.

M. A. Williamson.....Publisher
L. Charles Mazzola.....Associate Editor
C. R. Havighorst
Associate Editor, San Francisco
J. A. J. Jones.....Assistant Editor
Hilda G. Howe.....Art Editor
Donald D. Hogate.....Washington, D. C.
S. T. Henry.....Spruce Pine, N. C.

FOOD INDUSTRIES

Laurence V. Burton.....Editor
E. S. Stateler.....Associate Editor, Chicago
R. S. McBride.....Washington, D. C.
Malcolm Burton.....Washington, D. C.
Earle Mauldin.....Atlanta, Ga.
Economics Department
Stacy May.....Director
Dexter M. Keezer.....Associate Director

VOLUME 18, NUMBER 4

APRIL, 1946

TECHNOLOGY

FERMENTATION
Helped by Nutrients.....191
FOOD CHEMISTRY
Starch Broken Down.....191
BAKING
Aging Wheat Improves Baked Goods....191
New Flour Requires Some Baking Adjustments 76
DAIRY
Pasteurized Milk 191
Flavor in Dried Milk.....191
DEHYDRATION
Dried Tomato Product.....192
Changes in Dried Eggs.....192
MICROBIOLOGY
Propionate as a Germicide.....196
CANNING
Treating Tomato Juice.....196
"Undercooling" Retards Freezing of Canned Foods 97
Canning Technological Advances.....104
MEATS
Thawing Temperatures 198
Salts Prevent Bleaching.....198
CEREAL PRODUCTS
Caffein Extraction 200
PACKAGING
Testing Filled Sealed Cans for Leaks.....200
FLAVOR
Powdered Flavor 202
BREWING
Waterless Pasteurizer 202
MISCELLANEOUS
Toxicity of Manganese in Acid Soils.....204
MILLING
Flour Mills Go To "80"..... 78
FRUIT JUICES
Germans Using Improved Methods To Preserve Fruit Juices..... 80
SANITATION
Food Plant Sanitation Is Not Just a Chore—Part II 94
ELECTRONICS
Electronic Heat in the Food Industries... 90
FREEZING
Where Do We Go From Here With Frozen Foods? 112

THE COVER

This is a close-up of an automatic continuous filling line. Hot concentrated orange juice is fed to filler bowl. The liquid level is automatically maintained by a valve actuated by a float. (Acme photo)

DISTRICT MANAGERS

NEW YORK 18.....A. G. Sutherland
330 W. 42nd St. MEdallion 3-0700
BOSTON 16.....W. Donald Boyd
1427 Statler Bldg. Hubbard 4911
ATLANTA 3.....Ralph Maultsby
1011 Rhodes Haverty Bldg. Walnut 5778
CLEVELAND 15.....Thomas E. Taylor
1510 Hanna Bldg. Main 3081
DETROIT 26.....H. P. Ruprecht
2880 Penobscot Bldg. Randolph 1793
CHICAGO 11.....A. E. Del Gado
520 N. Michigan Ave. Whitehall 7900
PHILADELPHIA 2.....Edward A. Martin
16 S. Broad St. Rittenhouse 0670
ST. LOUIS 8.....G. G. Sears
3615 Olive St. Newstead 7600
SAN FRANCISCO 4.....J. W. Otterson
68 Post St. Douglas 4600
LOS ANGELES 14.....Roy Phelan
621 S. Hope St. Michigan 3873
SALES MANAGER, Ivan C. Miller

SPECIAL FEATURES
Wasting Our Substance In Riotous Striking..By L. V. Burton 71
Germans Using Improved Methods To Preserve Fruit Juices By Z. I. Kertesz 80
PERSONNEL
Job Evaluation May Help To Minimize Stoppage By Clifford W. Risberg 73
BAKING
New Flour Requires Some Baking Adjustments. By R. T. Bohn 76
MILLING
Flour Mills Go To "80".....By D. B. Pratt, Jr. 78
PRODUCTION
Conveyors Speed Evisceration of Poultry..... 83
QUALITY CONTROL
Water Content of Powders Determined by Rapid Method By Wendell P. Turner, Jr. 86
Food Plant Sanitation Is Not Just a Chore—Part II By M. E. Parker 94
Canning Technological Advances..... 104
Peanut Butter Improved by Changing Flavor and Texture By J. G. Woodroof, Helen H. Thompson and S. R. Cecil 109
ENGINEERING
DDT-Steam Sprayer.....By Ray B. Formeister 89
Pak-C-Lector Packs Rapidly..... 111
ELECTRONICS
Electronic Heat In the Food Industries....By V. W. Sherman 90
RESEARCH
"Undercooling" Retards Freezing of Canned Foods..... 97
MARKETING
Cold Trucks Cover State Delivering Sausage..... 102
FREEZING
Where Do We Go From Here With Frozen Foods? By Edwin T. Gibson 112
RAW MATERIALS
Australia Is Going Fishing.....By A. Makaroff 114

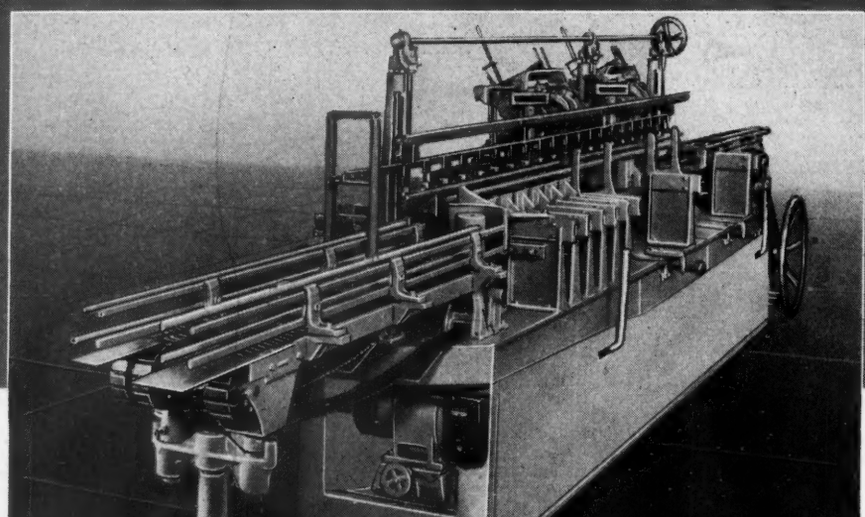
EVERY MONTH

Editorials .....71 and 116
The Talk of the Industry..... 72
Automotive 102
New Packages and Products.....118
Food Industry News.....125
Indicators 158
What Washington Thinks.....160
Men, Jobs and Companies.....163
Food Equipment News.....171
Catalogs and Bulletins.....187
Food Technology—Abstracts.....191
Books 206
Patents 209
Letters to the Editor.....211

McGRAW-HILL PUBLISHING CO., INC., James H. McGraw, Founder and Honorary Chairman. PUBLICATION OFFICE: 210 S. Desplaines St., Chicago 6, Ill. Return postage guaranteed. EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. (Address correspondence here.) BRANCH OFFICES: 520 North Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; 739-9 Oliver Bldg., Pittsburgh 22; Aldwych House, Aldwych, London, W. C. 2; Washington 4; Philadelphia 2; Cleveland 15; Detroit 2; Los Angeles 14; St. Louis 1; Boston 16; Atlanta 3. JAMES H. McGRAW, JR., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; HOWARD EHRLICH, Vice-President and General Business Manager; EUGENE DUFFIELD, Editorial Assistant to the President; JOSEPH A. GERARDI, Secretary, and J. E. BLACKBURN, Jr., Vice-President (for Circulation Operations). CABLE ADDRESS: "McGRAW-HILL, N. Y." Member A. B. P. Member A. B. C. Contents indexed monthly in Industrial Arts Index. Copyright 1946, by McGraw-Hill Publishing Co., Inc. — All rights reserved.

BEE-LINE

Your Labeling Operation



Labeling is last but by no means least on the production line. When your product arrives at that point you can't afford to risk traffic jams, collisions or detours. Put it on the BEE-LINE and be sure it gets through smoothly, swiftly, safely—all dressed up and ready to sell.

The WORLD BEE-LINE Labeler applies front labels, front and back labels, and neck labels if desired, to round, square, flat, oval or panel containers. Its gentle, bee-line action is ideal for the modern light weight glass.

Line up your labeled line for a ride on the BEE-LINE. It gets you there in first-class shape with no pummeling or pushing around.

Send us samples of your labeled containers and let us make accurate production and cost estimates for you.

WORLD LABELERS

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

WORCESTER, MASSACHUSETTS

New York Philadelphia Pittsburgh Chicago San Francisco Denver
Louisville Salt Lake City El Paso Seattle Portland Phoenix London
Montreal Toronto Winnipeg Spokane Vancouver Mexico City
Sydney, Australia Wellington, N. Z. San Juan, P. R. Ciudad, Trujillo, D. R.

FOOD INDUSTRIES is published monthly. Price 30c per copy. Allow at least ten days for change of address. Publication Office, 210 South Desplaines St., Chicago 6, Ill. Subscription rates: United States and possessions, Mexico, Central and South American countries, $3 a year, $4 for two years, $5 for three years. Canada, $3.50 a year; $5 for two years; $6 for three years (payable in Canadian or U. S. Funds). Please indicate position and company connection on all subscription orders. All other countries, $5 a year, $8 for two years, $10 for three years. Entered as second-class matter September 9, 1944.

Wasting Our Substance In Riotous Striking

AMERICA'S great unsolved riddle—which comes first, the hen or the egg?—is still receiving the earnest attention of substantial masses of our population. This momentous question must be answered the way labor wants it answered or else labor will not work.

How our fellow-man can get himself so worked up over such a riddle that he will bet every cent he owns, or can borrow, on his version of the answer is completely baffling. It is as impossible to understand as the migrations of the lemurs in Norway, which are said to plunge into the sea by the thousands, and drown themselves for no apparent reason.

Organized labor mistakenly insists that the hen of higher wages must precede the egg of increased production and prosperity. The correct answer is that increased production must precede the higher wages, for there is nothing but production from which wages of any sort may be paid.

Labor omits at least three fundamental factors from its economic thinking: OPA price controls, the possibility of an investors' strike, and the inevitable effect of the reluctance of labor to give a full day's work for a day's pay. In fact, the latter is falling off to such an extent that one suspects there is really no fundamental difference between ourselves and certain tropical workers who refuse to work after they have made enough to carry them for a week.

Labor is so positive of the correctness of its solution of the hen-egg riddle that it has struck many basic industries, thereby also causing much secondary unemployment in industries that depend on the products of the struck industries. Workers are rapidly going broke in those industries where strikes have lasted over 60 days. When a strike lasts three or four months it is a foregone conclusion that labor will not only use up all its own savings, but it will also use up all the credit of the merchants who try to carry unemployed strikers.

Vast economic buying power is thus frittered away and this wasting process is the equivalent of the reckless migration of the lemurs into the sea—a sea of debt.

WHAT purpose is to be gained by this blundering test of a half-baked economic theory? Not only is labor dissipating its own economic buying power, it is also making huge inroads on the cash resources of the employers. It should be obvious that any employer without plenty of cash is not a very satisfactory source of income.

A recent statement by Henry Ford II should be taken to heart by all: "The factory cannot make jobs—only the buying public can do that." Right now the buying public wants everything that labor can produce, yet in January labor elected to waste 19,200,000 man-days of production by strikes (BLS statistics). This is in addition to the further huge losses of production in industries that had to shut down or slow down for lack of steel, motors, switches and other needed things.

ALL the postwar plans of industry to give more jobs to returning servicemen are now in jeopardy, and much of the vast effort of industry to follow the lead of CED has been wasted. It is wasted because labor has decided that higher wages must come first before increasing production, instead of realizing that higher wages can be earned only by increased production.

How long will it take to educate workers and their chosen leaders in elementary commonsense? Could it be possible that Americans, like certain others whom we are apt to regard rather condescendingly, will work only when they are hungry?

The problem is not academic. It is real—nay, almost tragic—for the entire nation. For, the money that people had saved to buy durable consumer goods is being spent for food and shelter of the millions who are producing nothing but future grief for themselves—and all of us—while they are not working.

L. V. Burton EDITOR

The Talk of the Industry

• WILSON & CO'S. sales promotion of March, "The National Bread and Gravy Month," got off to a bad start with President Truman, Secretary Wallace and Secretary Anderson urging the public to eat less bread.

• DID you know the OPA has a ceiling price on railroad locomotives? Neither did we. One railroad wants to buy three monsters that cost more than $600,000 each, but according to OPA's last month price formula, they would have to be sold for considerably less. Hence no sale.

• ONE of the latest things in tie-in sales is to require a restaurant to buy 50 lb. of turkey with each 2 lb. of butter. One restaurateur complains that his refrigerators are so full of turkeys that he has scant room for other foods. This unhappy condition, we believe, could be eased if the restaurants would serve turkey properly. Steamed up cold turkey, as served in far too many eating places, is an abomination. And it is desecration of the finest food that America can produce.

• SOME sort of a broth made from watermelon seed as a cure for nephritis keeps reappearing in news items in the daily papers. It has also been brought to our attention, for at least 12 years, by a subscriber who has been seeking a dependable source of the seed in large quantities. If watermelon seed continues to gain in popularity for its therapeutic properties it will be necessary to institute a study of its commercial production.

We are sorry to relate that we offended the watermelon seed-conscious subscriber by suggesting that the easiest way to get the seed in quantity would be to bribe restaurant kitchen help to save the seed in melon time. Quite a few pounds ought to be salvageable in this way. But the subscriber was aghast at the thought of a remedy made from table refuse—garbage, for short.

The aforegoing suggestion is, however, based on a sound precedent. In the Rocky Ford, Colorado, area where watermelons are raised for seed, the problem of getting out the seed is solved fairly inexpensively by allowing the public to eat the melons free, provided they do it on the premises and dump all the seeds into a barrel. Since the weight of seed in a watermelon is about ½ of 1 per cent of that total weight, and there is small value to pulp from a ripe watermelon, the method seems to be fairly sound.

• SALMON canning on Kamchatka, a peninsula of U.S.S.R. that projects into the Pacific, will not be quite the same again since the defeat of Japan. For many years the salmon concession was held by the Japanese firm, Mitsubishi. On one occasion the workers, mainly local inhabitants, struck in the midst of the salmon run.

Faced with the threat of huge spoilage of fish, plus loss of many days of production, the local management appealed to the main office in Japan, which in turn appealed to its influential stockholder, the Emperor. Whether he was the present Hirohito or his father, Yoshohito, is immaterial. Utilizing his absolute power, the Emperor ordered a cruiser to patrol the water just off-shore.

When the strikers discovered that 11-in. guns were pointed at them, the work was resumed immediately. Which, as a method of stopping wildcat strikes, is not without its good points. But with the elimination of the Jap navy, Kamchatka salmon may not be quite so cheap in the future.

• "A THIRD factor influencing the proportion of money spent for food is the traditional 'boilermaker's highball,' whiskey with a chaser of beer, which is one of the cornerstones of a steel worker's diet. Braddock steel workers spend an average of $2.70 per week for alcoholic beverages." Quoted from page 35, *The Braddock Steel Worker*, published by United Steel Workers of America.

This same booklet on page 31 says the 1945 average wage after taxes is $45.92 a week. Thus nearly 6 percent of the weekly take goes down the hatch.

Let's see, now. Nine beers would cost 90 cents and nine snorts of likker would come to $1.80; total $2.70. Yup! the boys must be doing a little treating.

Hors d'Oeuvres

• Labeled the Green Cross for Safety, the National Safety Council launches a nationwide campaign, this May, aimed at winning general public support of its far-reaching accident prevention work. So, now we have the Blue Cross to see you through the hospital, the Red Cross to move in when the going gets too heavy for the Blue Cross, and the Green Cross to reduce the burden for both the Red Cross and the Blue Cross. Even the color blind can win at this game.

• *"Reach for a potato instead of more bread," is proposed as a slogan by the USDA, so that more wheat can go to the starving abroad. Good slogan for an even better cause. But, please, won't someonne explain the whole thing to all those other "reach for . . . instead" slogan writers?*

• The police in Victoria, Australia, are looking for a four-room house, found missing last December. The house was last seen standing where it ought to stand in January, 1945. Just in case the Victoria police are looking this way, the editor of FI can prove that he left their country six months before the house was last seen.

• *Hundeds of bushels of sweet potatoes are reported to be making their appearance in midwest markets garbed in fancy wrappings. Harvested in the fall, they are allowed to dry thoroughly before being polished on revolving brushes, powered by small electric motors, and wrapped in distinctly colored labels. Somehow, this reminds us of a blond we saw just the other day.*

• Corn cobs are now found to be worth 50 percent of their weight in ground shell corn, when used as feed. A plug for electric stoves says, "it may be more profitable to feed corn cobs to cattle than to burn them in the kitchen stove." It would also seem to be a more profitable use for the cobs not burned in the kitchen stove.

• *The Wine Institute tells of "absolutely heavenly" hair lotions concocted by a lady radio commentator. For blonds the lady recommends a recipe that includes white wine, honey and rhubarb stalks; for brunettes she suggests red wine with an egg and a teaspoon of soda. This seems to leave a lot of beverage for the red heads, unless you want to lump them in with the brunettes, which we don't.* J.A.J.J.

Sudden work stoppages can cause large losses when raw material is pouring into the plant at the height of the season. Will these tomatoes be processed or spoiled?

Job Evaluation May Help To Minimize Stoppages

Job evaluation is of especial interest to the food manufacturer if capable of preventing a costly stoppage or sudden strike. A job evaluation survey may also help reduce less spectacular losses in the food plant

By CLIFFORD W. RISBERG, Worden and Risberg, Philadelphia, Pa.

PROPER RATES of pay are at the heart of employer-employee relationships. Without an equitable and defensible payroll schedule, no company can hope to achieve maximum production or create a feeling of loyalty and harmony—high morale—which can be one of a company's most prized assets. It is both unfortunate and indisputable that dissatisfaction over rates of pay, usually the result of inequalities, has been one of the major reasons for strikes, walk-outs and work stoppages. In most industries, losses from strikes do not include spoilage of ingredient materials and work in process, or impairment of quality. In the metal trades, for example, incoming parts can be stockpiled, or orders for unshipped castings held up temporarily. When a milling machine operator walks out, he leaves a half finished piece in the fixture, which is completed when the strike is over. In contrast, consider the plight of the processor of perishable food, faced with a sudden strike. He suffers every loss experienced by the durable goods manufacturer, and in addition is hit hard in the place that usually represents the largest part of the production cost—the ingredient materials.

"We can't afford to pay that much for this job." All plant executives are familiar with this line of reasoning, if it is reasoning. The answer is a job evaluation study, which may show that the plant not only can, but must pay the rate in question. Proper rates make for smooth and efficient operation, with benefit to management, supervisors and employees throughout the plant.—The Editors.

A sudden strike at the height of the season is likely to catch the food processor with perishables in various stages of production all over the plant. Baskets of finished products, requiring sterilization, are lined up in front of the retorts. Carloads of produce are on the siding, others are enroute to the plant, and purchasing commitments will bring in additional material on specified dates. Only the most frantic activity on the part of the staff can avoid large losses, and will result, in any event, in a disorganized schedule.

The reader may well ask at this point whether the establishment of proper rates of pay through job eval-

uation will, in itself, eliminate the food packer's fear of these sudden and costly work stoppages and strikes. The answer is: If there is any connection between job performance and rates paid (and who will deny the relationship), then job evaluation, properly installed, can and will help to minimize these stoppages. Job evaluation will also do much more. The stoppages, severe as they are, are sporadic and usually unanticipated. Much more costly are losses and errors suffered in day-in and day-out work, costly but less spectacular. Many of these losses can be minimized by proper job evaluation.

Among causes of day-by-day difficulty are improper selection of plant personnel, inadequate training or poor supervision. Or, as happens too frequently, unqualified workers are employed simply because rates for certain plant jobs are too low to permit the personnel department to hire people possessing the necessary qualifications. Often, these rates and their relationship to other job values are traditional, having been originated, perhaps, by the fiat of a plant superintendent, long since gone but never forgotten for his autocratic decisions. Unfortunately, many companies still find themselves living with traditional job values in a postwar world. In some cases, such rates initially may have been in fairly good alignment. When jobs increase in value, however, while rates remain unchanged, trouble will eventually result.

Scientific Approach

Both management and labor benefit from a scientific approach to equitable and properly related incomes. This, the job evaluation assignment, has been dealt with in many excellent books and articles, all of them seeking a practical solution to the age-old problem of "What's the job worth?" They also include descriptions of methods, whether factor comparison, point rating, classification or ranking. Since, however, it is generally conceded that objectives and results are of primary importance, with the method to be used merely the instrument, this article will emphasize the "why" for job evaluation as it applies to the food industry, rather than the "modus operandi."

A number of reasons for job evaluation are common to all industries. Some of the major ones are:

1. Fewer grievances over relative job values.

Clifford W. Risberg, author of this article on job evaluation, is a partner in the Philadelphia firm of management consultants, Worden and Risberg, who have advised large food manufacturers on industrial relations, production management and related problems.

2. Higher worker morale.
3. Greater output, resulting from worker acceptance of rates.
4. Defensibility of rates in collective bargaining discussions.
5. Better payroll control over rates.
6. Improved standards and opportunities for promotion.
7. Better budgetary control over labor costs.
8. Truer allocation of labor costs by part or ingredient, by product, and by department.
9. More equitable distribution of incentive earnings, computation for which is usually made on the base rate.

An actual example will illustrate the type of situation requiring reevaluation. Ten years ago, a retort operator in Company X had only a few processing times, pressures, and cooling-times to worry about and his rate compared favorably with the job's requirements as they then existed. The company subsequently increased its line considerably and, today, the retort operator has 15 to 20 different processing times, pressures, and cooling times to watch. Obviously, a much more alert individual is needed. The selection requirements and rate must be stepped up in order to attract a better worker. Otherwise, eventual errors of over-process impair quality. Errors of under-process result in swells and leakers, scattered from the finished goods warehouse to kitchen shelves in the 48 states. As it turned out, this canner, before the condition was corrected, experienced a loss in rejected goods, handling expense and impaired good will running into hundreds of thousands of dollars. In addition, it became necessary to hold all processed goods in the warehouse for 10 days for inspection, prior to release.

"Bonus Crazy" Workers

An example of unnecessary in-plant loss of materials in process is the coupling of an incentive plan to inadequate base rates. This makes the worker "bonus crazy" in an effort to supplement low base earnings with a substantial production premium. Since "haste makes waste," lowered yields and poorer quality are usually the result. Any charge-back to the worker for excess waste, rarely, if ever, compensates for material loss, which is understandable when one considers that the cost of the material is usually many times that of labor.

In addition to proper rates for hourly workers, one must not lose sight of the staff employees, who carry responsibility for maintenance of yield standards, labor standards, quality or cost control. They include the chemists and technicians who pass judgment on raw ingredients and finished products; the production engineers who see that established yield standards are met and who devise means for improving yields and reducing material costs; the time-study engineers who must set correct values on measured jobs; the inspectors who are the watchdogs over established formulas and procedures. All these people are agents of management in the plant and, as such, must be paid in proper relationship to job value if the food packer is to expect standardized quality products at competitive prices. It avails management little to decry the efficiency of staff employees if management itself, through an inflexible attitude towards traditional rates, forces the employment of staff people whose main qualification is that they are willing to work for the price fixed, and who, if capable at all, will, at best, gear efficiency down to the rate paid.

The past four years have shown beyond question the need for compensating plant supervision in such a manner as to attract and retain personnel properly qualified to represent management on the production front. Those companies in the food industry who, for years, have recognized the need for maintaining an equitable payroll standard for foremen, and other supervisory employees generally, suffered the least during the war period. In spite of high worker turnover, chronic ab-

senteeism, and a lower level of efficiency, due to a disproportionate percentage of "green" help, some food companies were able to maintain quality and yield standards in "better than expected" fashion. For this, much credit must be given to the supervisors who stood as a bulwark against production disintegration.

Compensation of Supervisors

There is no doubt that the right attitude towards supervisory compensation on the part of forward-looking managements had much to do with retaining these key employees during the war years in the face of "quick money" offered on all sides. This question of supervisory compensation is one that is probably less easily solved in food companies than in most other industries. Since they are management employees, a salary instead of an hourly rate is indicated, but what to do about overtime? Even in normal periods of the year, when the hourly paid workers punch the clock at the end of the shift, the production foreman still has to spend extra time policing his department, seeing to it that nothing is left out that should go into the refrigerators, checking equipment, figuring the next day's schedule and performing other little tasks that are all part of his job. The receiving foreman may find himself at the end of the day with a carload of perishables that must be unloaded immediately to avoid re-icing cost. The maintenance foreman may have to spend several extra hours trying to analyze a fault in a closing machine needed for the next day's run. These are ordinary examples of the extra demands placed upon the supervisor's time. During a heavy run of a seasonal product, however, it is not unusual for supervisors to average sixty hours or more for a number of weeks at a stretch.

A company that pays time and a half for hours over forty to supervisors may find that high overtime pay is, in some cases, the reason for excess hours rather than the result of them. Another company may hold to the regular 40-hour rate for supervisors with no overtime pay at all on the basis that they are "exempt" employees under the wage and hour regulations. The first company will find itself with some supervisors who are more interested in total hours worked than in departmental efficiency. The second company will have a number of supervisors in an unhappy frame of mind, especially if their take-home pay is little more than that of the workers under them, as can happen during peak seasons. It was this sort of unhappiness that started the organization of foremen's unions, much to the distress of many managements.

Problem of Overtime

Proper payment to supervisors for overtime is comparatively simple if management will take steps to have an analysis made. It is not the purpose here to set forth a formula that can be used universally, since, in every company, there exist circumstances peculiar to that organization that play their part in determining the best procedure. This problem, which has often caused unnecessary concern, has its answer in the facts of the case.

In one company, for example, a foreman was paid a monthly salary, with no extra compensation for overtime. His assistant, although also exempt under wages and hours regulations, received a weekly salary plus time and a half. The foreman's base pay was considerably higher, yet during the pack of a seasonal product his assistant would out-earn him by 15 to 25 percent. To make matters worse, a number of the hourly workers in the department made more money than did the foreman. Incongruous? Yes, indeed, but this paradox was repeated many times throughout the organization. In fact, the standing quip among the "time and half" employees was, "better watch your step or they'll promote you to a monthly salary." The company was much disturbed over this situation and finally authorized job evaluation as a means for correcting it. Through evaluation, these two jobs were studied along with all others, many similarly off-base. The salary ranges eventually established reflected not only a 40-hour value but also included a plus for average overtime requirements. The net result was a healthy but justifiable increase for the foreman. As for the assistant, he was placed on a monthly salary at a rate that pleased him. In another food company, supervisors on shifts were paid in three different ways. In this case also, a uniform basis followed job evaluation.

The following approach could well be used by any food company that has not yet taken the trouble to have a job evaluation study conducted:

1. Evaluate all hourly jobs.
2. Evaluate all salary jobs up to approximately $6,000 per year.
3. Check results with area standards, within and without the industry, to establish that the payroll curve is in line with local averages.
4. Apply as evaluated, all rates and ranges for hourly jobs and non-exempt salaried workers.
5. Consider the possibility of placing the big majority of exempt employees on a monthly salary without overtime compensation. In so doing, investigate each job's average overtime requirements over a period of a year and make an appropriate adjustment.
6. Keep the evaluation up to date. New jobs develop. Some jobs become obsolete. Others change in character and value. Proper wage and salary administration will stay on top of these changes.
7. Adopt an employee merit-rating program, since evaluation of the job is not, in itself, enough. We must also evaluate the employee.
8. Define and apply the promotional levels brought out by job evaluation. In this way, it can be more clearly indicated how all employees, hourly and salaried, can step up the ladder as opportunities and their respective abilities permit.
9. Make sure the selection standards resulting from job evaluation are used by the employment department. This will increase the possibility of hiring better qualified workers in all divisions of the business.

Proper Base Rates More Important than Wage Incentives

"It may well be asked whether the establishment of proper rates through job evaluation will, in itself, eliminate the food packer's fear of sudden work stoppages and strikes; solve his problems of below-standard yields on costly ingredients; curtail production errors, which have their repercussions in the ledger; and provide for proper selection of staff employees and supervisors. The answer is simply this: If there is any connection between job performance and rates paid (and who will deny the relationship), then job evaluation, properly installed, can and will help. The straightening of the payroll curve will do away with cases of under-pay and over-pay within the plant and will produce a payroll schedule that can be enduring and defensible, when tied in with area standards.

Many food companies have spent much money, and wisely so, on wage incentives, which account for less than 25 percent of the worker's take-home pay on an average. Let an equal amount of attention now be given to the 75 percent represented by base pay — and the rewards to management will be pleasantly surprising." — The Author.

New Flour Requires Some Baking Adjustments

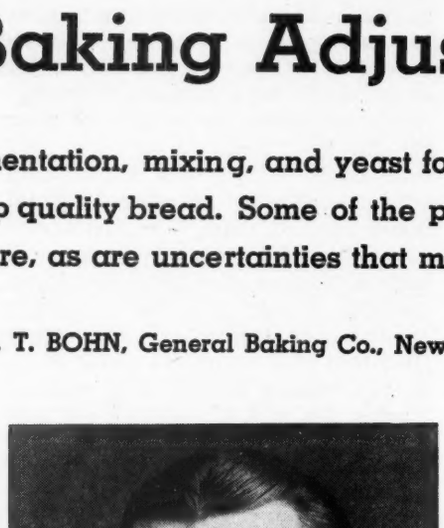
A close watch on fermentation, mixing, and yeast food requirements will be necessary to achieve top quality bread. Some of the problems the baker may look for are outlined here, as are uncertainties that must await developments

By R. T. BOHN, General Baking Co., New York

WAR FOOD ORDER 144 requires that "Effective March 1, 1946, no miller shall produce any flour which consists of less than 80 percent by weight of the clean wheat from which such flour is produced."

As the average yield of flour now used by the baker represents 72 percent or less of the wheat berry, this means an addition of portions of the mill feeds will be necessary to increase the yield to 80 percent. The baker of bread or sweet yeast-raised goods, cookies, crackers, etc., will have no alternative but to use this long extraction flour and must apply his technical knowledge and skill to producing the highest quality merchandise possible from it. The miller will have many mechanical problems to solve in order to produce the best type of flour of this extraction from the wheat available. At first the tendency will be for the mills to run greater yield than 80 percent in order to be on the safe side and the first flour produced will reflect this. The problems of the baker will be far greater. He will be confronted with a raw material with a greater variation in uniformity than he has been accustomed to and a series of manufacturing problems resulting from the inclusion of more of the outer portions of the wheat berry in the flour. These will introduce more variable and greater enzymatic properties than in the 72 percent extraction flours.

The formulas, processes and equipment used by the baker have been set up for years to handle a flour which, on the average, represented 72 percent of the wheat berry although flours of considerably shorter extraction have been required and used in the past for certain particular purposes, both in the bread and cake baking industries. These were



R. T. BOHN

obtained by separating the mill streams in such a manner as to produce a flour of as short extraction as desired, the remainder of the 72 percent flour yield from the wheat being classed as clear and used for various purposes. The accompanying chart shows graphically just why the baker will find differences in the new 80 percent extraction flour in comparison with the old 72 percent. Normally, 72 lb. of flour, 14 lb. shorts or middlings, and 14 lb. bran are obtained from 100 lb. of wheat of good milling quality. Some millers are able to produce slightly more than 72 percent of a high quality flour acceptable to the baker from 100 lb. of wheat. Others have difficulty in obtaining 72 lb. flour and at the same time produce a flour that meets competition in quality and price. But 72 percent is generally considered a good average.

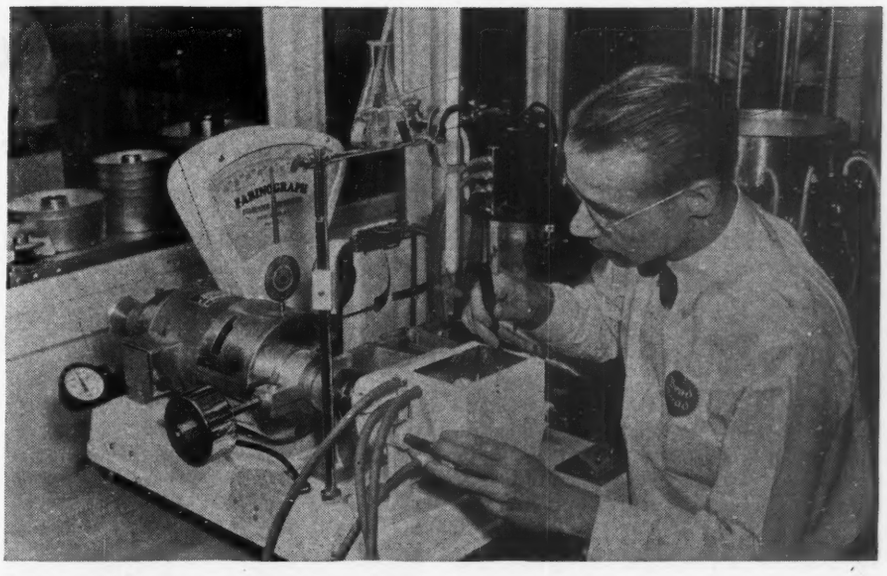
This 72 lb. of flour, termed a "straight grade," included all of the so-called "clear" flour mill streams that are shown in the chart as first and second clear. By removing certain of these clear flour streams, a shorter extraction flour containing less bran particles and of better color and "dress" is obtained. The clear flours, which are high in ash and protein, were available to the baker for blending purposes in the production of rye bread and other specialties. The addition of eight percent more of the wheat to the straight grade of flours means that a larger amount of the outer coating of the wheat will be included in flour that the baker must now use. This introduces certain special problems that can be anticipated at this time.

Uncertainty as to Properties

A great deal of information has already been released by bakery service organizations of the mills and technical groups of the baking industry. In many cases this information is based on examination of a very meager number of samples, some of which were prepared on laboratory experimental mills. For this reason, there has been considerable confusion as to just what the baker can expect in the way of different properties in the 80 percent flour in comparison with the 72 percent to which he is accustomed.

At this time, the quality of 80 percent extraction flour cannot be discussed in terms of the usual ash and protein factors, which have been used for many years by mills and bakers as evidence of quality and uniformity. There have not been enough samples of commercially milled flour, nor enough mills surveyed to draw any general conclusions at this writing. There is every evidence, however, that a well-equipped mill using good wheat will

be able to produce an 80 percent extraction flour that will give strikingly excellent results in terms of color, grain, texture and flavor and keeping qualities of the bread compared to the usual extraction flour. The production of some mills, however, reflects inability to obtain the proper bolting cloths as yet, and inherent lack of what is termed a "long milling process" to produce an 80 percent extraction flour with a minimum of the outer portion of the wheat included. Production of 80 percent extraction flour is a challenge to the knowledge, experience and ingenuity of the miller, as well as to the technical knowledge and skill of the baker. The miller has his problems. This early date is no time to judge what the milling industry as a whole can do in producing the most satisfactory 80 percent extraction flour. Some flours of this type are strikingly excellent in quality. Others are being improved as the days and weeks go by.

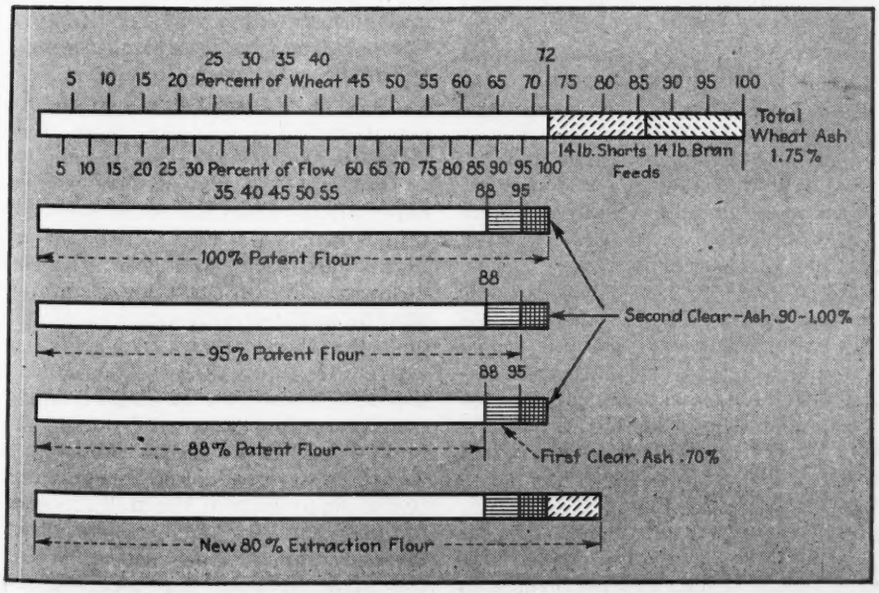


Carefully prepared 80 percent extraction hard winter wheat flour shows little deviation in the Brabender farinograph curve characteristics. Substitute flour will require few mixing changes.

Flour Blending Important

The baker, in the meantime, will have to check the quality of shipments of 80 percent flour and blend them in proportions to minimize the effect on bread quality until he can exercise intelligent selection and discrimination of the sources of supply. It is the practice in baking to blend flours to minimize a possible unfavorable action of any particular brand. The baker undoubtedly will blend shipments of the 80 percent flour in small quantities with the blends of the flour that he is now using and note carefully the behaviour of the dough during fermentation, mixing and processing, which will enable him to anticipate greater differences when using all 80 percent extraction flour. With the use of the average 80 percent extraction flour, the baker will be confronted with a series of new problems, with which he is not wholly familiar, and it will demand all his skill to adjust the fermentation, mixing, yeast food requirements, and other problems to obtain his maximum quality in bread from 80 percent extraction flour.

The simplest test the baker can make to guide him in judicious blending of 80 percent flours from his various sources of supply is the time honored "Pekar Test" or "slick test." There is such a great difference in quality between 80 percent flours at this early time that it is relatively easy to determine which mills are doing the best job by slicking flours up, side by side, examining the smooth, firmly packed surface of the flour for color and particles of bran. If desired, a slick can be dipped into water and dried on the surface to magnify the difference in color that potentially will be reflected in the crumb color of the bread and give a clue to what can be expected in the way of baking characteristics, compared to his standard flour, or with 80 percent extraction flour reflecting good milling practice.


25 30 35 40
72
5 10 15 20 Percent of Wheat 45 50 55 60 65 70 75 80 85 90 95 100
Total Wheat Ash 1.75%
14 lb. Shorts 14 lb. Bran Feeds
5 10 15 20 25 30 Percent of Flow 60 65 70 75 80 85 90 95 100
35 40 45 50 55
88 95
100% Patent Flour
88
Second Clear - Ash .90 - 1.00%
95% Patent Flour
88 95
88% Patent Flour
First Clear Ash .70%
New 80% Extraction Flour

The chart shows graphically how 80 percent extraction flour compares with other flours in ash content. The ash will remain a valuable index, as it reflects the ability of the mill to do a clean separation of the bran from the endosperm and the reduction of the latter to flour.

Ash Content an Index

The ash content of a flour is generally used as an index of the grade or percent of extraction. Within certain limits it is of extreme value. Even with 80 percent extraction it will be helpful in classifying flours. With the new flour, as in the case of the flours of 72 percent extraction or less used by the baker, the ash will reflect the ability of the mill to do a clean separation of the bran from the endosperm and a reduction of the latter to a flour.

Some mills will produce an 80 percent flour with an ash content strikingly low. Reports have appeared showing the ash content ranging from .60 to 1.90 percent for spring wheat and from .53 to .70 percent for hard winter wheat flours, depending somewhat on protein content. The higher the ash of the 80

(*Turn to page* 228)

Flour Mills Go To "80"

Mandatory for millers after March 1, the higher extraction flour puts a premium on laboratory control and experimental plant operations. The change-over is proving less disruptive than might have been expected

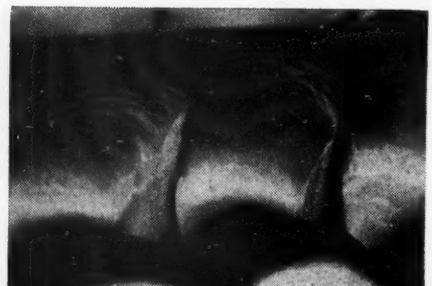
By D. B. PRATT, JR., B. A. Eckhart Milling Co., Chicago

PROMPT COMPLIANCE with War Food Order 144, requiring millers to extract 80 percent of the wheat berry in making flour, presents numerous problems. The change-over from the former 72 to 75 percent extraction involves the selection of the portion of the berry to be retained in the flour, the methods that will result in a minimum of bran particles, and the selection or grading of the cleaned wheat to get a uniform quality. At the same time, the mill must be operated at a commercially profitable production rate.

Provisional solutions to these problems have been decided on in the 14 days between the issuance of the order, on February 15, and its effective date, March 1. These tentative solutions have been based on reports from the flour mill control laboratories, data from laboratory experimental mills, and the experience of technically trained millers. Coordination of this information has resulted in changes in milling procedure and equipment in order to make flour in compliance with the terms of the order. At the same time, consideration had to be given to consumer preference and bakeshop performance.

Milling Procedure Described

For those who are unfamiliar with wheat milling procedure, a brief summary of milling operations will help to emphasize the changes that compliance with the Order made necessary. Stated in elementary terms, the milling of wheat to make flour is accomplished in a series of mechanical crushing and pulverizing operations in which the wheat berry is reduced to the fineness desired for the intended use of the flour. The crushing and pulverizing action is obtained by passage of the wheat berry between revolving steel rolls. The surfaces of these rolls vary from relatively heavy corrugations on the "break," or crushing rolls, to very light or no corrugations on the "reduction," or pulverizing rolls.



Bread (A) made from 80 percent extraction flour has an exterior loaf appearance practically identical with that of (B) made from 72 percent extraction flour. Crumb is slightly more coarse and slightly dull in color. Color difference in photo is greater than registers in the human eye.

If whole wheat flour is the intended end product, the entire cleaned wheat berry is crushed and progressively reduced in particle size by passage between the steel rolls until all its particles will pass through sieves or bolting silks of a predetermined mesh opening. Wheat milled in this manner yields flour of 100 percent extraction; 100 percent of the cleaned wheat becomes flour containing all the bran and other portions of the cleaned wheat berry.

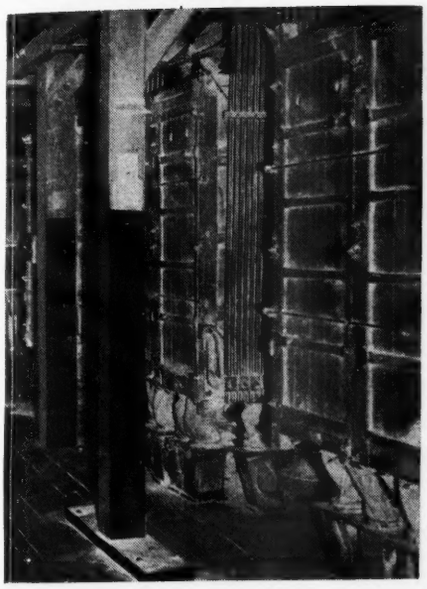
When flour with a lower percent of the cleaned wheat berry—less than that contained in the whole wheat flour—is desired, the mechanical operations include separation of the undesired portions of the wheat berry, particularly the germ, bran, and portions of the endosperm adjacent to the bran layer.

In the making of these lower extraction flours, the grinding and separating operations are performed in a manner to give a series of "mill streams." These mill streams come from the break or crushing rolls, from sieves or screens that separate the germ, bran, and endosperm of varying particle size and from the reduction or pulverizing rolls. Each mill stream has a composition that is characteristic for the portion of the wheat berry being dealt with at that particular step in the milling operations. The particular combination of these mill streams selected for the making of the flour determine both the quantity and the quality of the flour obtained from a given quantity of cleaned wheat.

Separation of Mill Streams

Under the customary method for milling wheat, from 72 to 75 lb. of "straight" grade flour was obtained from 100 lb. of wheat. The remaining 28 to 25 lb. of the wheat was in the mill streams used for animal and poultry feeds. The flour made in this manner is known as "72 or 75 percent extraction" or "straight" flour. The percent of the wheat berry recovered as straight flour depends upon the variety of wheat milled, the plumpness or endosperm content of the wheat berry, and the skill of the mill superintendent in conditioning the wheat and in separating the mill streams to obtain the maximum percentage of the desirable portions of the endosperm in the flour mill streams.

The "white" or "patent" flours are obtained by further selecting the mill streams to contain the more highly desirable portions of the endosperm. The mill streams containing the less desirable portions of the endosperm are combined to give a grade of flour known as "clear flours." These two grades of flours may be further separated into "long patent" or "short patent" and "first clear" or "second clear," according to the separation of the mill streams of which the patent or the clear flours would normally consist. When the straight flour represents a 72 percent extraction of the cleaned wheat, the patent flour from that wheat would represent 80 to 85 per-



Substitution of 9 XX silk cloth in the sifters or bolters for 10 XX cloth becomes necessary to permit passage of fibrous endosperm particles into the flour.

cent of the 72 percent extraction or about 57 to 61 percent of the cleaned wheat. The remaining 15 to 20 percent of the 72 percent extraction would be clear flour; about 11 to 14 percent of the cleaned wheat.

War Food Order 144 prohibits the separation of the flour streams into patents and clears in addition to stipulating that the flour extraction from the cleaned wheat shall be 80 percent instead of 72 to 75 percent.

The first problem to confront the wheat miller was to determine from where the other five to eight percent extraction was to be obtained. Obviously, it had to come from the feed stream. Since the feed stream was composed of various portions of the wheat berry, normally undesirable for flour, a decision had to be made as to what portion of the feed stream would be least undesirable and least difficult to cut into the flour stream. This the laboratory had to determine.

Utilization of Feed

When the identity of the portions was determined, a question of milling procedure had to be answered as to whether the particular feed streams should be cut into the flour stream without milling them further or to mill them out as flour. That question had to be answered by an agreement between the control laboratory and the sales department on which procedure would give the better product in respect to appearance and bake-shop performance. From that point, the technical training and the experience of the mill superintendent had to be relied upon to effect the necessary changes in the milling operations and equipment.

In the absence of information on how long WFO 144 would be in effect, decision was made to follow the procedure that would disturb the entire mill the least, and to concentrate on milling out an additional quantity of flour from the selected mill streams normally going to make feed.

Even that decision necessitated some change in milling procedure. Flour streams containing relatively large quantities of feed material cannot be reduced satisfactorily to flour fineness on the smooth rolls of conventional reduction milling. Consequently, the surfaces used for grinding these selected mill streams had to be changed from smooth rolls to corrugated ones with 38 to 42 cuts per inch. In the making of 72 to 75 percent extraction flour, rolls with these corrugations have, in most instances, been used for "first and second tailings," "first and second low grades" and possibly the "sixth and seventh middlings." These streams are probably the ones from which the additional five to eight percent extraction can be obtained with the least difficulty.

Also, these same streams would not bolt satisfactorily through 10 XX and finer silk cloth. That means the sifter silks had to be changed to 9 XX to keep bolting capacity up to the grinding capacity of the mills as well as to permit the fluffy fibrous stock, normally feed stock, to pass through into the flour. Some mills are reported to be using 8 XX sieves to obtain the necessary bolting capacity.

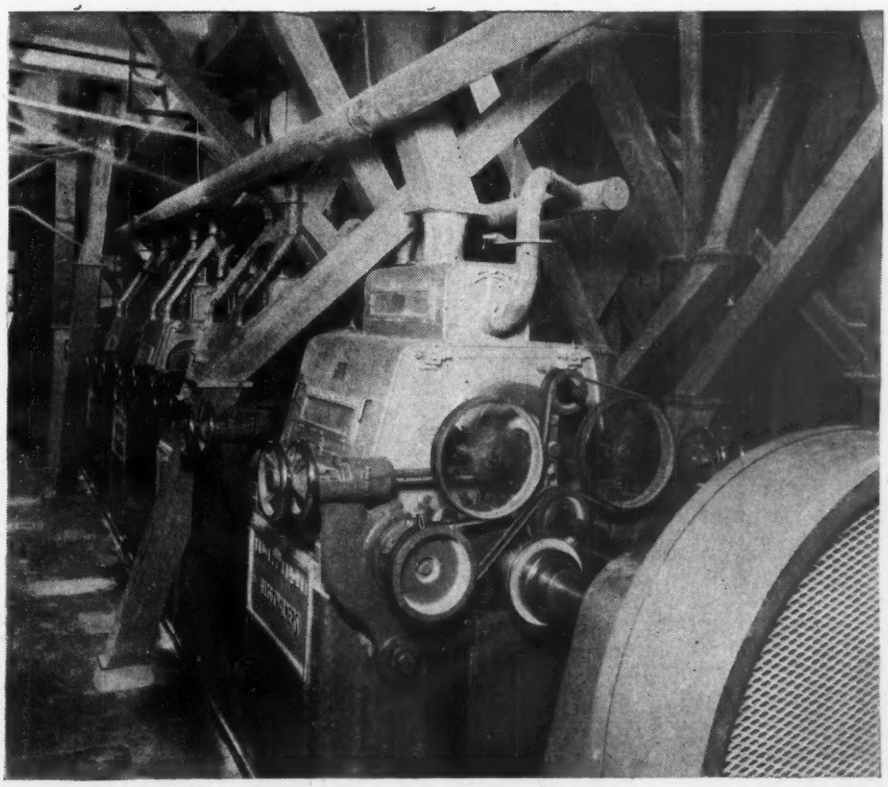
Production Reduced

In spite of the changes in the rolls and in the silk cloths, all mills have had their production capacity reduced by the making of 80 percent extraction flour. Whether the bottlenecks in the grinding and sifting areas can be fully eliminated remains to be determined.

Problems associated with the mechanical change-over of the mills to make 80 percent extraction flour were only a portion of those the millers faced. Some of these other problems were of chemical classification. Stated simply, they were:

1. Will the 80 percent flour require more or less maturing agent?
2. Will it require more or less bleach?
3. Will it require more or less diastatic malt flour?
4. What changes will have to be made in the enrichment treatment?

(*Turn to page* 240)



Milling of wheat to 80 percent extraction flour necessitates substitution of corrugated "break" type rolls for smooth "reduction" rolls to obtain the additional 8 percent flour from the mill stream.

Germans Using Improved Methods To Preserve Fruit Juices

By Z. I. KERTESZ, New York State Agricultural Experiment Station, Cornell University, Geneva, N. Y.

How unfermented fruit juices, of fine quality, were produced by methods unknown, or unused in this country. Mellowing by mold enzymes, concentration by continuous freezing, storage in CO_2 under pressure revealed

IN preparation for, and during World War II, unfermented fruit juices were a part of the general nutritional scheme of the German government. Technologists, who throughout the years had made many contributions towards improving the methods of manufacturing fruit juices, were urged to continue their efforts, giving special consideration to improving the quality and increasing the volume of production.

The desirability of selecting the proper variety of fruit and fruit blends for the manufacture of fruit juices is greatly appreciated in Germany. Several of the agricultural experiment stations (Hohenheim, Berlin - Dahlem, Geisenheim, etc.) worked continuously on the selection of the most suitable fruit varieties as well as on the breeding of new and better varieties. It is well known that, because of cultural and climatic conditions, and the inevitable variations in consumer preference, such selected varieties are likely to show little usefulness under a different set of conditions, and for this reason the variety question will not be discussed here.

The washing, grinding and pressing of the fruit was in most cases done by methods similar to those used in this country. While some factories of superior modern design and equipment exist, in most cases the machinery used was not quite up to our standards. This is especially true of the smaller country plants where much obsolete equipment is still in use.

In the United States, preference is about equally divided between cloudy or "pulpy" juices on one hand, and clear, sparkling juices on the other. In Germany, sparkling fruit beverages are generally preferred, and indeed most of the developments discussed below are applicable only to clarified juices.

For clarification, the old gelatin-tannin method was often used but enzymatic clarification became more popular during the past decade. Two enzymes were sold for this purpose in Germany. The mold enzyme, "Filtragol" was developed by Dr. A. Mehlitz[1] at the Geisenheim fruit experiment station and was manufactured by Bayer at Leverkusen for I. G. Farbenindustrie. The other enzyme, "Pectinol" was invented and developed in this country[2] and was manufactured for the German market by Röhm and Haas at Darmstadt. Both enzymes were known in this country before the war, and apparently no major developments in their manufacture and application for fruit juice clarification occurred in Germany in recent years. It may be mentioned that in large scale operations both enzymes were applied in the presence of about 0.1 to 0.2 g. gelatin per liter of fruit juice.

An interesting development, yet in the research state, is the "mellowing" of fruit juices and wines by the use of mold enzymes. The original driving force behind this idea was the desire of the large pharmaceutical firm Boehringer und Sohne of Ingelheim, to dispose of the approximately 1,100 tons of fungus mycelium per year that they had on hand as a byproduct of the large scale manufacture of citric acid.

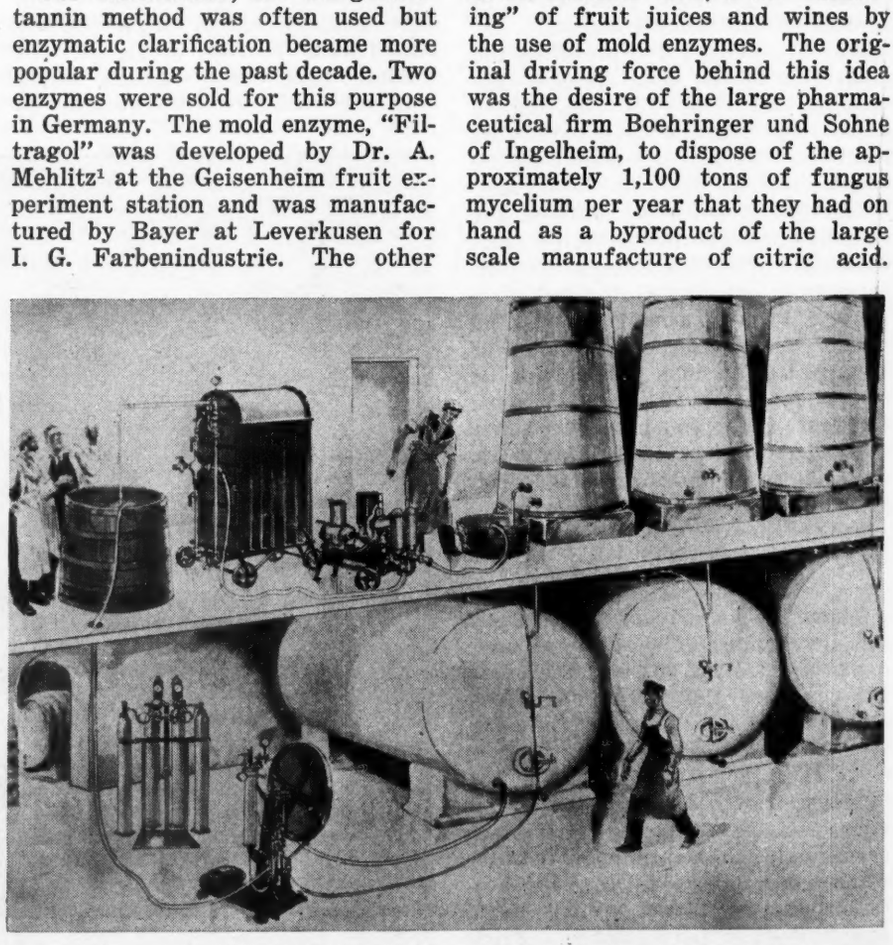


FIG. 1. The freshly pressed juice is clarified, in the tanks at the top. After sedimentation, it is drawn off and pumped through a Seitz filter, carbonated and stored in glass lined tanks under a pressure of 120 lb. per square inch.

During the storage of wines many changes in flavor occur. Some of these are assumed to involve alterations in the aldehydes present by either the Cannizzaro reaction or oxidation. Others involve the so-called "esterification" of the ethanol to give mellow, bland flavors. Now it is known that a fungus mycelium is a veritable arsenal of enzymes that may affect the rate of chemical changes occurring in a stored wine. When deflavored fungus mycelium was used in making wines, it apparently did hasten the occurrence of the "mellowing" reactions.

Storage May Improve Flavor

A main difference between our way of thinking and the views of German technologists is that, according to them, the storage of a fruit juice under proper conditions will improve its flavor, while we seem to assume that the quality of a fruit juice will run the customary undesirable downward course, as in most other preserved products. An observation of some of the stored fruit juices seems to justify the German opinion. It is stressed by German technologists, however, that fruit juices must be filtered completely clear for this desirable "mellowing" of the flavor during storage, and that in cloudy or even insufficiently clarified juices, bitter side-flavors will usually occur during storage. According to several German technologists, the use of fungus preparations to obtain a desirable

This is the first one of several articles dealing with the developments in the German fruit products industry during the war years. The observations reported here were made during the summer of 1945, under the sponsorship of the Food and Agriculture Sub-Committee, Technical Industrial Intelligence Committee. The release of this information has been approved by the Office of Publications, U. S. Department of Commerce, Washington.

effect on the flavor development in storage shows definite promise. The work, which was under way in Germany at the end of the war, aimed at the hastening of this flavor development in stored fruit juices, by either using an enzyme in addition to the usual clarifying enzyme, or by replacing the clarifying enzymes with new preparations, which will also have this further desirable effect on the flavor. The writer cannot resist the prophecy that the same principle of flavor development, by the use of enzymes, may be applicable to many other products, as cheese, for instance.

Sterilization by Filtration

Sterilization by filtration depends on the removal of microorganisms from the fruit juice by filtration, and is obviously only suitable for juices that are to be sold in the clarified condition. The method was developed some time ago and has been known in this country, but to the writer's knowledge has not been used here in the commercial, large scale production of fruit juices.

There are two main modifications of this method. In the first one, the clear juice is filtered free of microorganisms and is then stored in sterile containers from which it is eventually filled into sterile bottles. The second modification, developed just before the war and little known in this country, is very popular in Germany, where it is used in preference to the original Seitz method. In this "Seitz-Böhi" process (Fig. 1) the juice is filtered and then "essentially" germproofed, whereupon it is cooled and stored under about eight atmospheres carbon dioxide pressure. At the time of bottling the carbon dioxide is removed and recovered, while the juice is again passed through a germproofing filter and bottled under "aseptic" conditions (Fig. 2). The writer had occasion to taste many samples of fruit juices produced by the Seitz-Böhi process, on both pilot plant and commercial scale. The flavor and aroma of such samples of apple juice, white grape juice and raspberry juice were excellent indeed, and definitely superior to most products sold in this country. Some white grape juice samples, made from Vinifera grapes, were reminiscent, in flavor and "bouquet," of fine quality wines, and the aroma was so pronounced in some of these that it was difficult to tell whether the beverage was an unfermented juice or a wine.

The objection is often raised that the germproofing method is not suitable for large scale operation. This is clearly erroneous. Among the plants visited by the writer was one owned by the Hummel and Co., at Winnenden near Stuttgart. This modern plant uses the Seitz-Böhi process and has a storage capacity for over 530,000 gallons of juice in glass-lined pressure tanks. In recent years it produced over 800,000 gallons of clear, bottled apple juice annually, in addition to a number of other juices handled in the same manner. The "aseptic" bottling at this plant proceeds through one line of production at the rate of 1,200 quart bottles per hour. Fruit juice plants using this process, and producing on a similar scale, were visited at other places in Germany and are known to exist throughout the fruit growing regions.

Flash pasteurization is also used in essentially the same manner as in the United States.

Upon comparison, products made by the germproofing method were

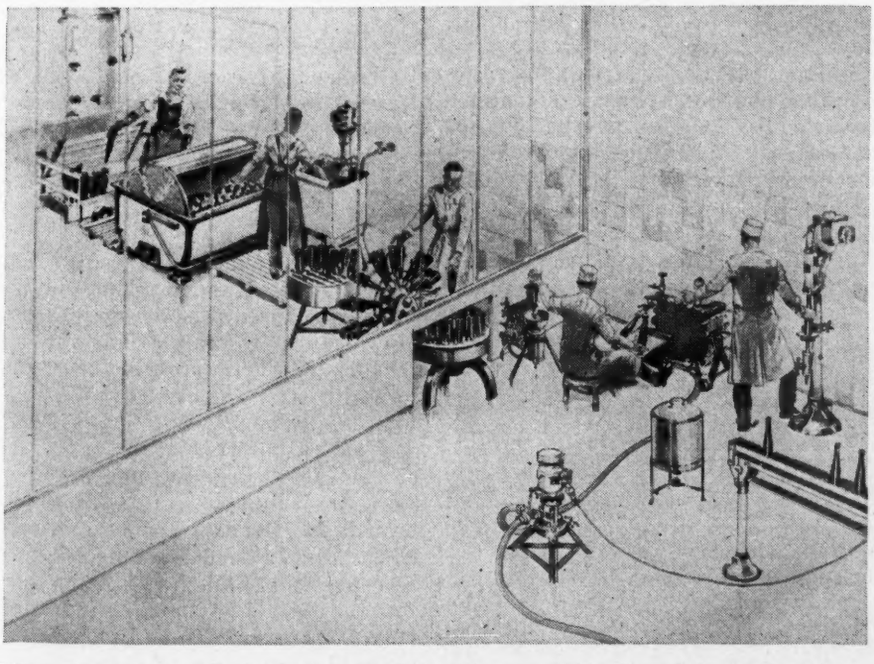


FIG. 2. After washing, the bottles are rinsed in sulphurous acid and sterile water. The juice is pumped, by the small pump in the foreground, through a Seitz E-K filter and immediately bottled. Caps used are pre-sterilized.

obviously superior to those produced by flash pasteurization.

Ultraviolet Sterilization

Ultraviolet sterilization would permit the preservation of fruit juices without the application of heat and has attracted the attention of food technologists all over the world. It may be of interest to summarize the advances made in the application of ultraviolet sterilization in Germany. Machines for the ultraviolet sterilization of milk and fruit juices were constructed by the Quarzlampengesellschaft Hanau shortly before the war. The path of the liquid exposed to the radiation was short and the layer thick (1 in.). It has been extensively tested by Weinmann and Stürk[3] at Geisenheim, but the results were not very satisfactory. When passing through various fruit juices, in anything approaching commercial capacity, only 80 percent of the yeasts and 70 percent of the molds were destroyed. Toward the end of the war, an improved machine was developed at the Dairy Research Institute at Kiel and made by the Siemens-Schuckertwerke. This employed quartz tubes approximately 6.6 ft. long with an inside diameter of ⅜ in. Fifty tubes were connected with return bends of a polyvinyl resin to form a spiral through which the juice was circulated. The spiral was surrounded by 28 mercury vapor tubes. The machine was being tested when, due to the end of the war, the work was interrupted, but preliminary tests indicated that it may work well in the pasteurization of milk. If this be the case, it is likely that it will also be useful for the sterilization of fruit juices, and provide means for the simple manufacture of quality products.

Methods of Concentration

Two main methods of concentrating unfermented fruit juices were used in Germany during recent years. The first was by vacuum concentrators essentially similar to the types used until recently in this country. The other method was the Linde-Krause procedure of continuous freeze concentration. This latter procedure was perfected for commercial use about the time hostilities commenced. There were several units in use in Germany during the war, some installed on barges. When the war ended, several units were either manufactured or actually being assembled in Hungary, to produce concentrated berry juices for German use.

A continuous freeze concentrator is shown in Fig. 3. The freezing operation is performed on the outside of a refrigerated drum which revolves, at a rate of about five revolutions per hour, in a trough of fruit juice. The drum has a useful surface of about 150 sq. ft. On its inside are 16 freezing coils for direct ammonia expansion. Refrigeration is supplied by a Linde compressor with motor. Ice is removed by a scraper knife.

The thickness of the ice coating on the drum can be governed by the freezing temperature, speed of rotation and level of the liquid in the trough. The desirable thickness will depend on the concentration of solids in the fruit juice as well as on its physical properties. With a juice containing 12 percent solids, the optimal thickness of the frozen layer is about ¼ in., with more concentrated starting solutions it may be thicker.

As the knife removes the layer of ice from the drum, the ice should have an average temperature approximately 2 deg. F. lower than the freezing point of the desired concentrate. The ice is conveyed by an endless belt into a special patented[4] ice press which consists of a worm and a surrounding sieve. The purpose of the ice press is to remove concentrated juice that has become entrapped in the ice. The speed of rotation of this press may be varied between 7 and 21 r.p.m., depending on the volume of ice and the pressure desired. The pressure customarily used is said to be about 4,000 lb. per sq. ft. The concentrate, which is pressed out, flows through a strainer and then into a container, usually made of earthenware. The ice enters a melter, where it is used for the preliminary cooling of the juice in a plate cooler. The juice attains a temperature between 34 and 40 deg. F. Two pumps, one for transporting the original juice and one for removing the concentrate, complete the unit. All parts of the machine that come into contact with the juice are made of stainless steel.

The unit is suitable for the concentration of juices with an original soluble solids-content from 3 to 30 percent. Juices that are likely to thicken excessively, or to gel upon concentration, are previously treated with clarifying enzymes. The procedure is suitable for clear juices only, since the embedding of suspended particles in the ice will decrease the efficiency of the press and result in higher losses of solids. The discarded ice normally contains from 0.5 to 2.0 percent solids. The concentrating ratio is usually about 2.4:1 and with a 29 percent solids-content approximately 1,100 lbs. of concentrate are produced per hour.

The writer tasted several concentrated fruit juices made by this method. They were all of very good quality, especially the raspberry juice concentrates.

High Ascorbic Acid Juices

German nutritionists are strongly opposed to the addition of synthetic vitamins to any food products. To supply the ascorbic acid (vitamin C) requirements of the population, the Wehrmacht and especially the crews on U-boats, a number of special fruit products were manufactured during the war. The Hummel plant, for instance, produced over 50 tons of rose hip sirup per year. This was a vacuum-concentrated extract from rose hips often imported from as far away as Bulgaria. The final product had a pleasant acid flavor, a sp. gr. of 2.4 (at 60 deg. F.) and a pH of 3.8. According to information obtained in Germany, it contained, when freshly made, about 200 mg. ascorbic acid. Samples analyzed during the past few months indicated only a range of 86 to 109 mg. ascorbic acid. These lower values may be the results of storage losses. A

(*Turn to page* 216)

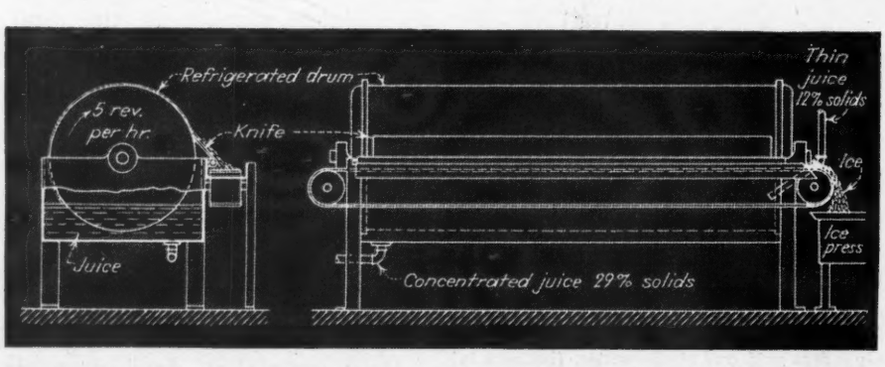
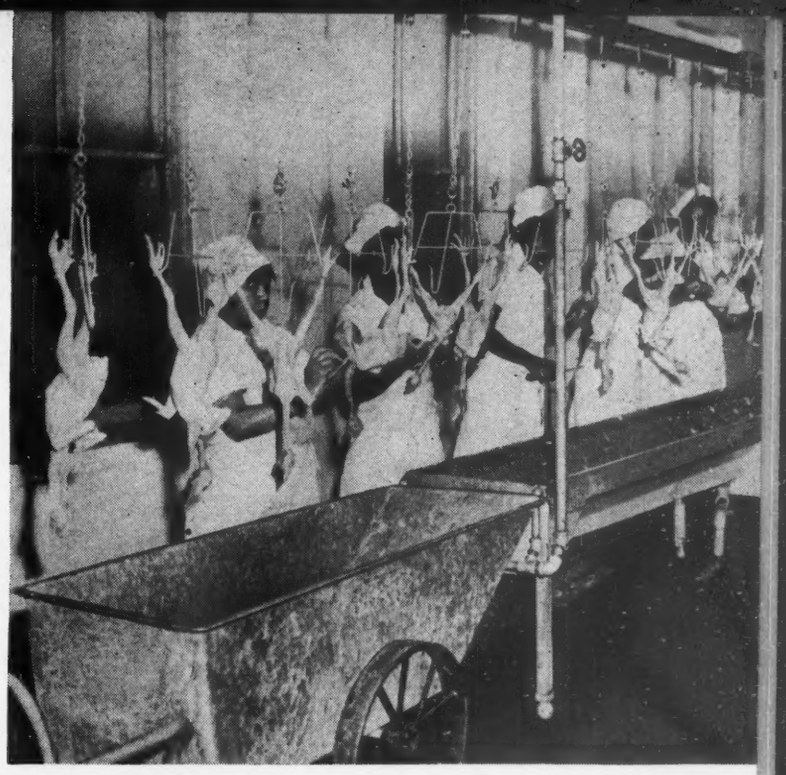


FIG. 3. Linde-Krause freezing drum. Concentration ratio is about 2.4 to 1. Juices with initial solids of 3 to 30 percent can be handled. Discarded ice runs 0.5 to 2.0 percent solids.

Conveyors Speed Evisceration Of Poultry

Efficiency and ease of inspection are two advantages of a conveyor installation for the evisceration of poultry, which is used by Charles Keeshin, Inc., one of the larger poultry operators of the Middle West. Keeshin found semi-mechanization so successful that two identical plants were built, one in Chicago, and the other at Rogers, Ark. These plants were each designed for the evisceration of between 800 and 1,000 birds an hour, a schedule maintained by a staff of 39 women and 4 men. Chickens, fowl, ducks, geese and turkeys can be handled. Plans for operation and layout had the general approval of the Dairy and Poultry Branch of the U. S. Department of Agriculture. The equipment for the Keeshin plants was engineered and manufactured by the Globe Company of Chicago, specialists in eviscerating equipment. Similar installations for eviscerating are in a number of poultry processing plants.



1. Shackles, hung from the conveyor, carry the birds through the entire evisceration operation. The upper picture shows the steps of slitting the necks, removing the crops, placing the heads in the head hooks, and opening the carcasses. The eviscerating trough is water-lubricated.

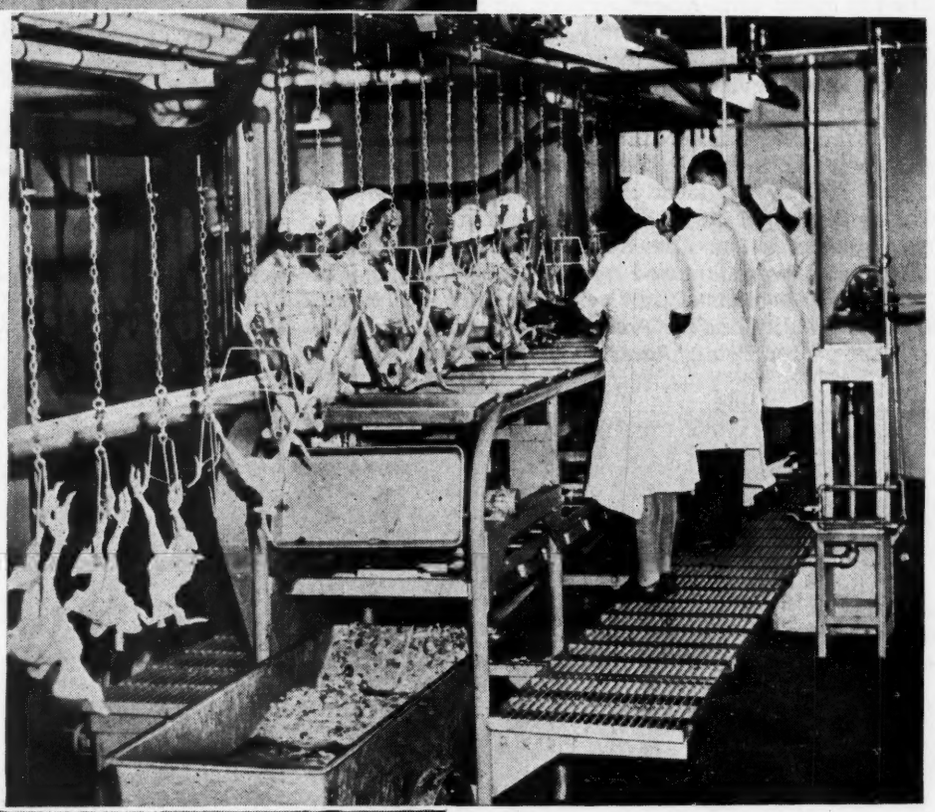
2. Birds are carried over the inspection table (shown below), where two operators remove entrails and set them on moving pans below the birds from which they were taken. Government inspector examines the carcass and entrails at the same time. Empty pans pass through a washing cabinet.

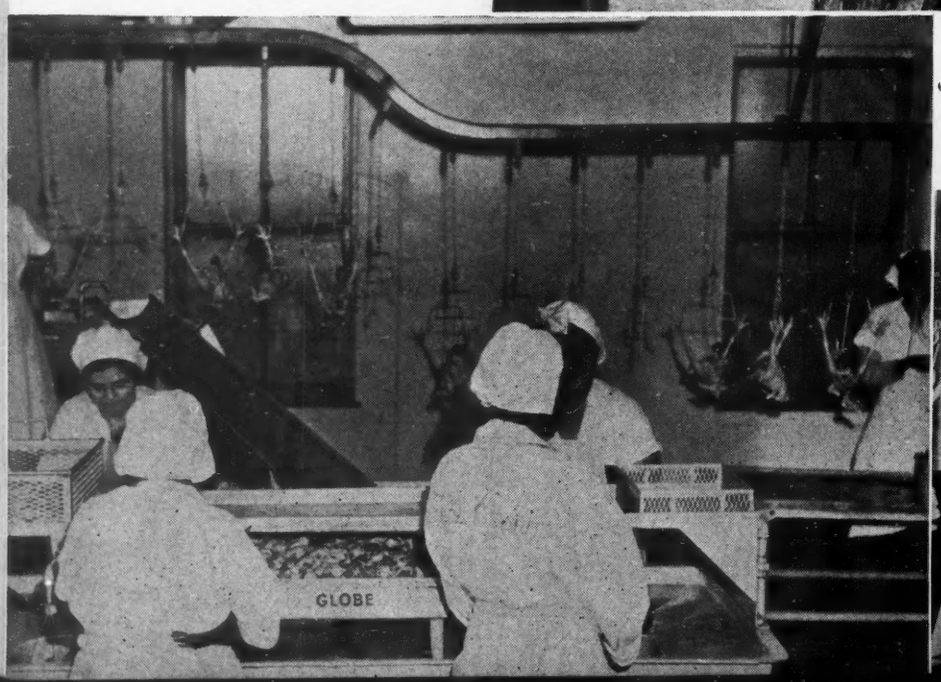
3. Closeup (left) of government inspector at work. Gizzards, livers and hearts are removed from the entrails after the birds pass inspection. Livers and hearts are trimmed and washed on the side table at the right. Movement of the trays is synchronized with the movement of the shackles of the conveyor.

4. As the birds (below) clear the inspection table, the gizzards are placed on the inclined chute, which carries them to the gizzard cleaning table. Dump truck receives balance of entrails falling from pans at the end of the table. Fluorescent lighting is used throughout. Walls are white enamel.

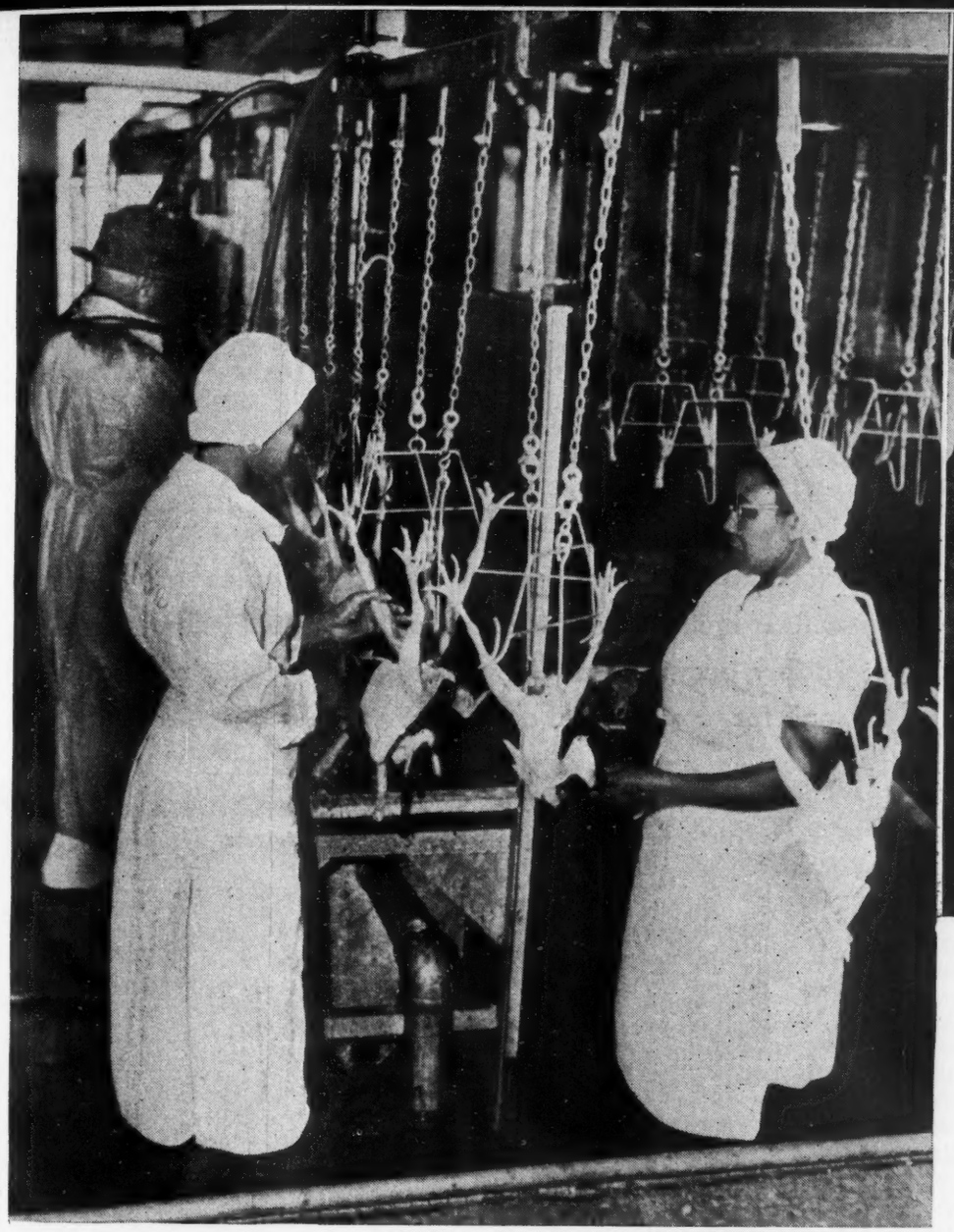
oultry processing articles previously tblished include new and improved produres for handling the birds prior to e evisceration operations presented in ese pictures. See articles by Harry E. rews, FOOD INDUSTRIES, *October and ovember, 1942, and February, 1945.*

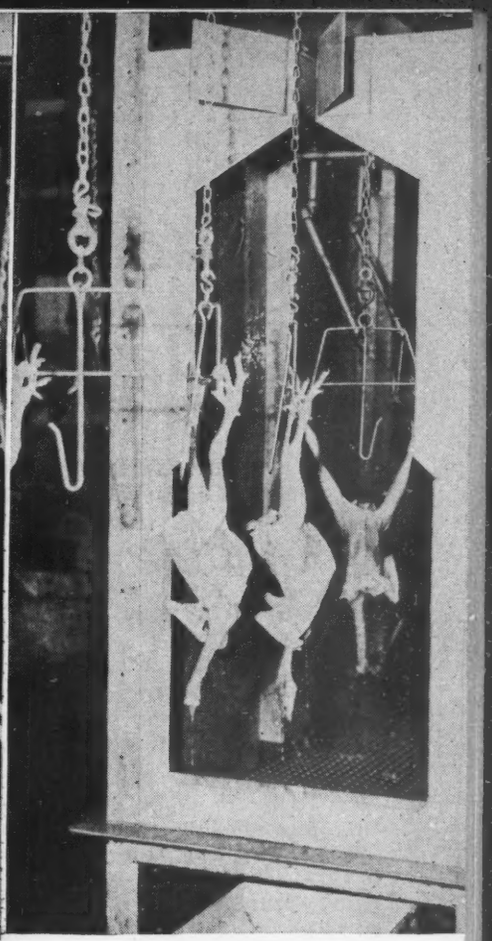
Gizzard cleaning table (below) with running water and positions for four operors. Catch basins beneath table prevent dirt, nes and trimmings from entering and clogng sewer. Rear of picture shows how conyor carries birds down to convenient height removal of lungs and kidneys. It takes approximately seven minutes for a bird to travel m the first operation through to removal from conveyor ready for packaging. Speed of eration can be regulated by placing birds on ternate shackles, on every shackle, or on ery third shackle. The conveyor is arranged hold birds at the proper height for each eration, without necessity for straining or xching on the part of any of the workers.





6. Removal (below) of lungs and kidneys. They are washed down this water-lubricated table into a catch basin with a removable basket. All operations are "on-the-line."

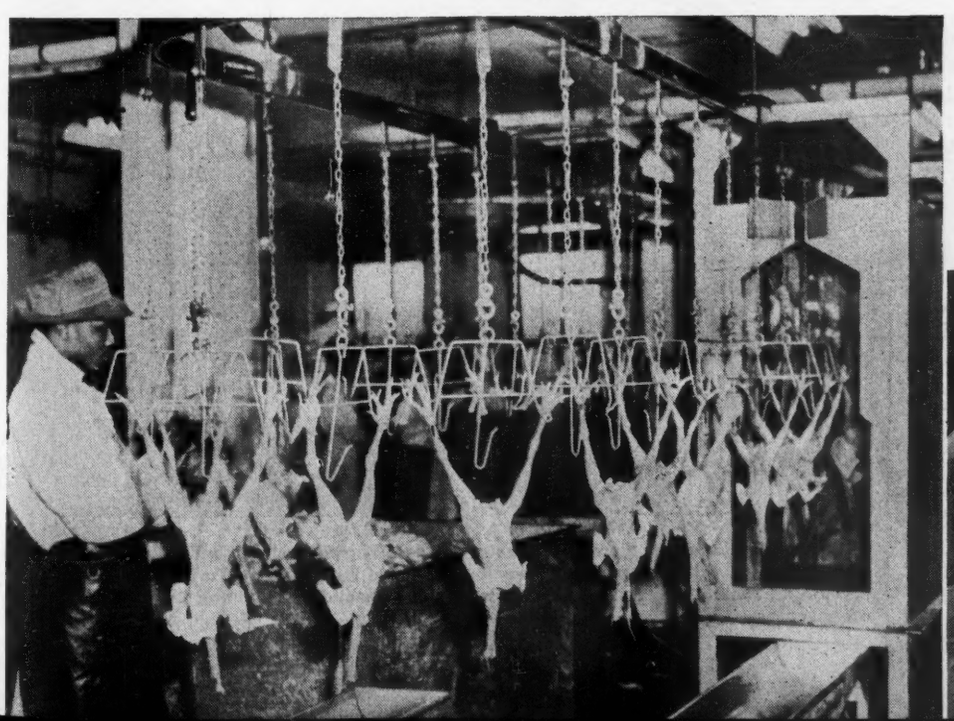




7. (Above): Operator at the right of this picture cuts off heads. Birds are then given final inspection to see that all entrails, lungs and kidneys are properly removed. Man at left washes inside of birds. All loose pieces are shot out with 100 pounds of water pressure. The evisceration operations are all performed in a room about 45x85 feet. Special flooring material, used throughout the plant, has the strength of concrete but is only one-tenth as heavy.

8. After birds have been cleaned inside, they enter the washing unit shown above, where 17 spray nozzles insure complete washing of the outside of the carcass. The line is lead through by guide plates.

9. After washing, the birds (below, left) are ready for packing. Operator, at left, in this picture, cuts the birds down and leaves the feet in the shackles. Another operator removes feet from the shackles, which then return to the start of the line.



10. Packaging is shown below. Giblets are wrapped and placed inside the birds, which are scaled for size, and individually wrapped. Weights are marked on the packages. Wrapped birds are then placed in commercial containers, ready for hotels, railroads, restaurants or other markets.

Water Content of Powders Determined by Rapid Method

By WENDELL P. TURNER, JR., Food Technologist, Research Division
Chain Belt Co., Milwaukee, Wis.*

Moisture determinations in 15 to 20 minutes are possible with a method that is based on the Karl Fischer reagent. Highly accurate and quite simple, the method is a useful tool for continuous control of drying plant operations

SHELF-LIFE or stability of dehydrated foods is influenced appreciably by their residual moisture content. For that reason, an accurate moisture determination method is an important factor in quality control. It will indicate, to some extent, the length of time the products can be kept safely in storage or moved through channels of distribution without deterioration or loss of flavor. The method, in addition to being accurate, should also be rapid, so as to permit frequent checking on the results being obtained at various steps or stages in a continuous process.

The lack of a quick and satisfactory method has been a troublesome handicap in drying plant operations in the past because several hours often elapsed before the moisture content of a given sample could be known. In the meantime, the plant continued to operate, turning out material that might later be found below standard. Worse still, a varying moisture content would necessitate dividing the production into a series of "runs" identified by "lot" numbers. In either case, the final product would very likely be penalized in quality grade.

Determination of the "moisture" in dehydrated food materials, such as egg, milk, citrus fruit and instant coffee powders, where the water content runs less than two percent, is not too satisfactory by the traditional methods, which include (1) oven drying to constant weight, (2) holding in a desiccator to obtain constant weight, and (3) distilling out water with an immiscible solvent. These methods may easily entail a time lag of two hours or longer. Technologists in charge of quality control in dehydrating plants accordingly need a method that is both quick and accurate.

In view of the frequency and importance of "moisture" determinations in the analysis of foods, we

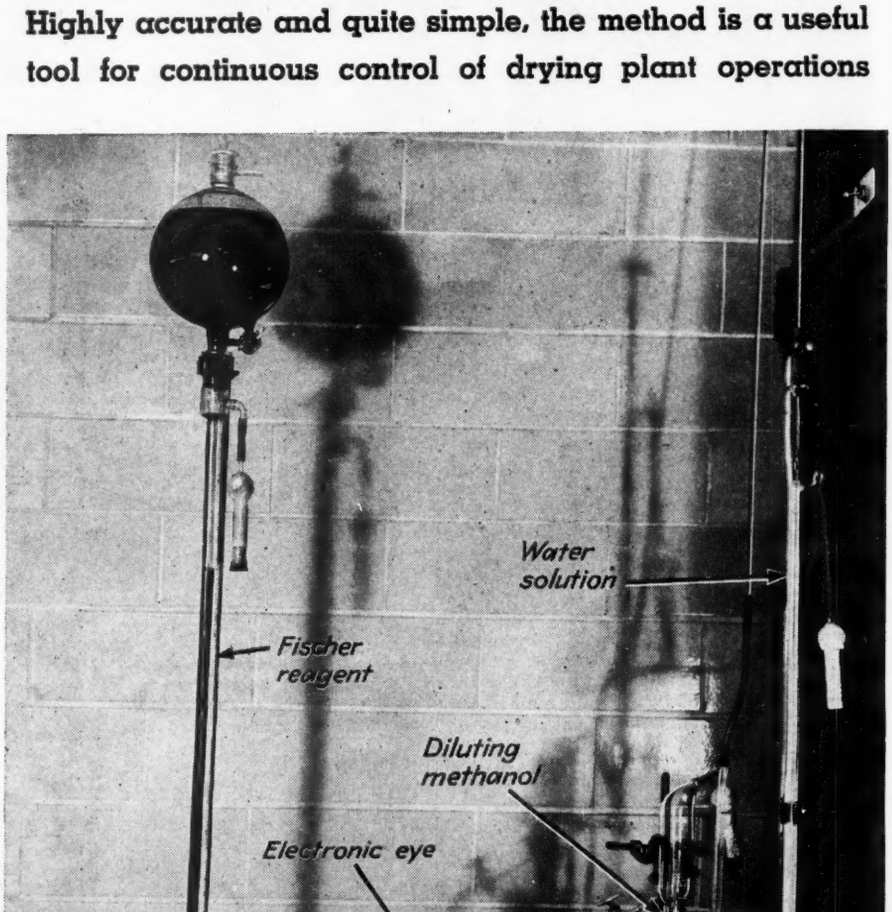


FIG. 1. Setup for water determination in powdered foods, using the Karl Fischer reagent, requires only a table or shelf that may be placed in the production area convenient for the taking and testing of samples. Wall or extension connections, delivering 110 v.-a.c. electricity, are necessary.

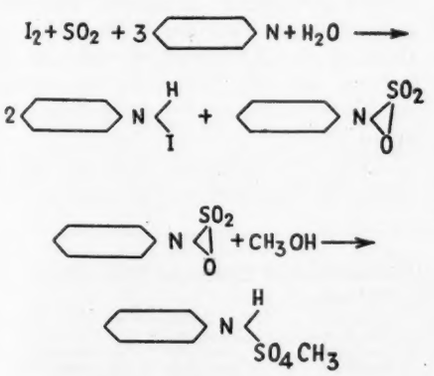
*Now with Ivanhoe Foods, Inc., Auburn, N. Y.

have studied the value of the Karl Fischer reagent in tests for water or moisture content in raw and finished materials. The results of our studies indicate that this reagent will be of value to those concerned with quality and moisture control in food processing plants.

An interesting amount of material has been published previously on the Karl Fischer reagent and its use in determining water in various materials.[1,2,3,4,5,6,7,8,9] In our laboratories we have set up a modification of the published procedures that we find extremely satisfactory for the control of our research runs in pilot plant production of food powders continuously prepared by sublimation-drying under high vacuum. The method has been found rapid and accurate. It appears to be fully applicable to the measurement of total water in most food powders[6,8] and, with modifications, to materials other than powders.[2,6] The important factors in the method are the reagents.

Reagents

Karl Fischer reagent: Much information is readily available on the nature of the Karl Fischer reagent[1] and on its preparation and standardization. In brief, the reagent is a mixture of iodine, pyridine, sulphur dioxide, and methanol. General acceptance is that this mixture reacts with water in two steps according to the reactions:



These reactions, however, have not been found to continue to completion. Consequently, they are not satisfactory for stoichiometric calculations. Instead, the reagent is standardized against a known quantity of water. It is prepared so that the mol ratio of iodine:sulphur dioxide:pyridine by weight is 1:3:10. For example, SO_2 is bubbled through 700 ml. pyridine until 380 gm. have been added. This liquid is cooled to room temperature and one more liter of pyridine and 200 ml. of methanol are added. The solution is kept cool by placing its container in an ice bath while slowly adding 500 gm. of iodine crystals. The flask is rotated in the ice bath until all of the iodine has dissolved. If the liquid is not kept cool during the addition of the iodine, the exothermic nature of the reaction will cause boiling over.

The reagent has a dark red-brown color. It can be stored for several weeks before use. It is protected from atmospheric moisture by tubes of drierite and is dispensed from an all-glass burette of the type shown in the left of Fig. 1. (Ace Glass Co., Cat. No. 3325.)

The pyridine that we use is Eastman No. 214-H. All alcohol used in this method and as a diluent is Du Pont "Refined Methanol," purchased in drum lots, which we found to run about 0.15 percent water.

Diluting Methanol: The diluting methanol was dispensed as received in drum lots through a 25 ml. automatic pipette (E. H. Sargent & Co., Cat. No. S-11015), shown in Fig. 1.

Water Solution: Since the water solution used in standardizing the reagent retains its standardized value, we prepare a 5-gal. carboy at a time by measuring in a convenient number of liters of methanol and then adding 5 ml. of water per liter of alcohol. The carboy is shaken to insure uniformity. This solution is dispensed in back-titrating the Fischer reagent through the moisture protected burette in Fig. 1.

Titration Assembly

When the Karl Fischer reagent is titrated with standard water solution the dark red-brown solution changes to a bright yellow at the end-point. Unfortunately, this color change, although very apparent, is not rapid and distinct enough to be used for an analytical indicator. Consequently, a more sensitive means of determining the end-point has to be used. An apparatus that indicates electronically the end-point of the titration was recently described in the literature.[5] This apparatus was tried in our laboratories but was found to vary in accuracy with fluctuations in our 110 v. power lines. To overcome that objection, H. L. Zimmerman of our electronics laboratory designed and assembled the circuit shown in Fig. 2 and in the center of Fig. 1. This apparatus is extremely sensitive. It retains its accuracy despite ordinary fluctuations in the 110 v. line, which occur when heavy electrical loads are applied in other parts of a manufacturing plant.

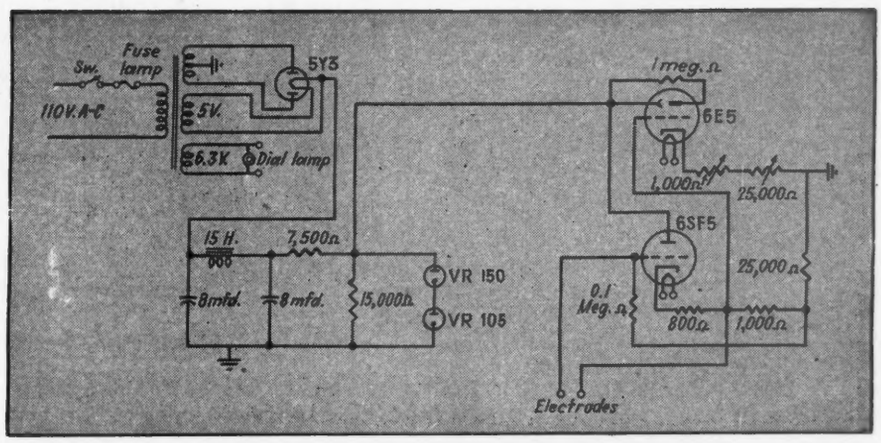


FIG. 2. Wiring diagram of electrometric apparatus, used with Karl Fischer reagent, which gives extreme sensitivity in titration end-point, regardless of fluctuations in line voltage.

TABLE I—Comparative Results of Moisture Determinations by Two Different Methods*

Material	Fischer method	Oven method
Spent grain..	8.3	8.0
Spent grain..	2.9	3.0
Corn flakes ..	9.3;9.4	9.7;9.6
Wheat flour..	12.1	11.4 (5 hr. drying) 11.6 (8 hr. drying)
Oat flour	8.1	8.1
Soy flour	6.0	5.9
Wheat gluten	7.6	7.5
Wheat	7.1	7.0
Barley	7.3	7.3
Apple nuggets	1.2	1.2
Apple nuggets	1.5	1.5
Apple nuggets	1.7	1.9
Apple nuggets	1.6	1.6
Calcium phosphate .	3.9	3.6
Skim milk powder ...	4.8; 4.8	4.9; 4.9
Dried eggs...	3.5; 3.5	3.7; 3.7
Cocoa	2.6	2.7
Malted milk ..	4.0;4.0	4.1;4.1
Bouillon powder	2.8;2.8	2.4;2.4
Malt sirup ..	20.0	20.1 (Pycnometer)
Malt sirup ..	19.6	19.5 (Pycnometer)
Malt sirup ..	21.5	21.4 (Pycnometer)
Condensed whole milk.	62.0	62.3
Condensed skim milk.	73.5	73.3

*"A Preliminary Investigation of the Application of the Karl Fischer Reagent to the Determination of Moisture in Cereals and Cereal Products." R. H. Fosnot and R. W. Haman, Cereal Chemist, p. 47, January, 1945.

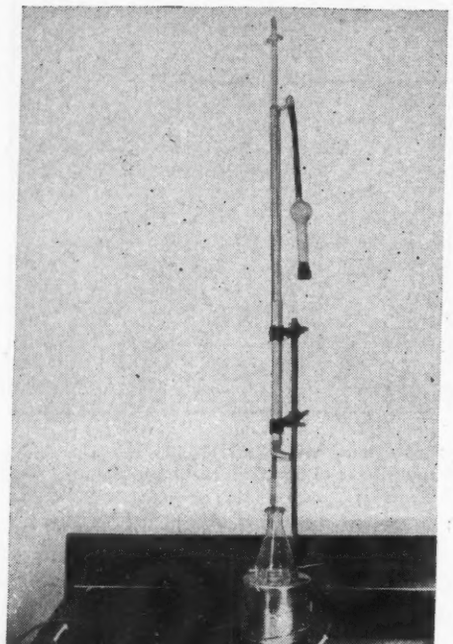


FIG. 3. Constant stirring during titration is obtained through use of a glass-inclosed iron slug subjected to a rotating magnetic field.

The end-point is indicated by a resistance change between platinum electrodes in the solution being titrated. We have found the fusing of short lengths of platinum wire into 125 ml. flasks, as shown in Fig. 3, to be convenient and conducive to accuracy. These wires are then soldered to grid caps (obtained from burned-out radio tubes discarded by all radio repair shops) that are sealed to the flask with a mixture of litharge and glycerin. Ordinary grid-cap connections are then made from the flask to the electronic end-point apparatus. One such assembly is shown connected, and one disconnected, in Fig. 3. All solutions are introduced into these flasks through rubber serum bottle caps (A. H. Thomas, Cat. No. 8788 1-in. diam.) with the aid of No. 18 gage 2 in. hypodermic needles as pictured in Fig. 1. Also, shown in Figs. 1 and 3 is the A. H. Thomas magnetic stirrer (Cat. No. 9235-R) that causes a glass-inclosed iron slug to rotate within the flask as a result of a rotating magnetic field. With this type of apparatus the solution being titrated is well protected from atmospheric moisture. Accessories such as electrodes and stirring rods, that would otherwise need to be introduced through the flask mouth, are eliminated. Even a technician inexperienced at glass blowing can make a good supply of the titrating flasks and stirring slugs for the laboratory in one day. The flasks, stirring slugs and rubber caps are kept in a desiccator over $CaCl_2$ until used.

Equations

(1) $$R = \frac{\text{ml. Fischer soln.}}{\text{ml. water soln.}}$$

(2) $$b = (\text{ml. Fischer reagent}) \times R - \text{ml. water soln.}$$

(3) $$W = \frac{\text{gm. water weighed}}{(\text{ml. Fischer reagent}) \times R - (\text{ml. water soln.} + b)}$$

(4) $$\%\ H_2O = \frac{[(\text{ml. Fischer reagent}) \times R - (\text{ml. water soln.} + b)] \times W \times 100}{\text{grams of sample weighed}}$$

Standardization

To establish the standardization constant, a dry flask, stirring slug, and rubber cap are removed from the desiccator and 25 ml. Fischer reagent is introduced. The flask is then set on the magnetic stirrer and the Fischer reagent titrated with the water solution to the end-point indicated by the closing of the electronic eye, which has been adjusted with the eye control knobs to a sensitive position. The ratio of Fischer reagent to water solution is then established according to equation (1). This ratio factor, R, must be determined each day. Factors for the other solutions remain constant.

The titration is carried out by adding the water solution at the rate of about one drop per second from the beginning of the determination rather than by adding the reagent slowly only near the end-point. This drop-by-drop addition from the start was found a necessary precaution to compensate for a known lag in the chemical reactions that occur.

A second flask, slug, and cap are taken from the desiccator and 25 ml. diluting methanol introduced through the automatic pipette. A measured excess of Fischer reagent is also added and the flask is placed on the magnetic stirrer and titrated with water solution to the electronic end-point. A correction factor for the water in the 25 ml. diluting methanol is then calculated using equation (2).

A third flask, slug, and cap are removed from the desiccator and weighed on the analytical balance. About three drops of water are added to the flask, which is then capped and reweighed to determine the exact weight of water added. Then, 25 ml. diluting alcohol are introduced and an exactly measured excess of Fischer reagent. The excess Fischer reagent is then back-titrated on the magnetic stirrer as before, and the factor for the water solution calculated according to equation (3).

After the solutions are prepared and standardized, a determination

TABLE II—Fischer Method of Determining Moisture Content Compared With Other Commonly Used Methods

Comment	Fischer method	Toluene distillation method	Vac. oven (5 hr.@70°C) method	Desiccator to constant weight method	Vapor pressure methods
Approximate time for a result after sampling	15 to 20 min.	2 hr.	5 hr.	3 to 4 wk.	¾ to 1 hr.
Accuracy	±0.01% H_2O	±0.1% "moisture"	±0.01% "moisture"	±0.01% "moisture"	±0.01% "moisture"
Disadvantage	Some interfering compounds may need to be accounted for but are not often found in food materials	Caramelization, loss of volatiles, end-point arbitrary; result indicates "moisture"	Possible heat breakdown, loss of volatiles, end-point arbitrary; result indicates "moisture"	Excessive time delay; results indicate only "free moisture"	Research required to prepare calibration curve before running test on new materials
As a control method	Worth trying	Too slow and inaccurate	Too slow	Too slow	Worth trying
In cost control of new materials on a percent basis	For accurate analyses	Deferred check (rough)	Deferred check	Too slow	Possibilities

of water in a powdered food material is run as described below.

Determination of Water in Sample

A dry flask, slug, and cap are removed from the desiccator and weighed. An approximately 1 or 2-gram portion of the powder being examined is poured into the flask, which is immediately capped and reweighed. The difference in weight gives the weight of the powder sample taken. Then 25 ml. diluting methanol are added and also a measured excess of Fischer reagent. The flask is set on the stirring apparatus and allowed to stir for a definite period. Three minutes have been found sufficient time for the Fischer reagent to react with the moisture in most powders as obtained in our pilot plant operations. The back-titration with water solution is then carried out drop by drop until the electronic eye indicates the end-point. The percent of water in the sample may then be calculated from the data given by equation (4).

Water content determined in this manner by the Karl Fischer reagent method has been found satisfactory for such food materials as starches, sugars, pectin, egg powder[8], flours, cocoa, malted milk, powdered soup, certain sirups, and condensed milk products.[6]

Although this method is not offered as a panacea for all moisture-testing ailments, it is established as rapid and accurate when interfering substances, if present, are known and accounted for.[5]

References

1. Smith, Bryant and Mitchell, Analytical Procedures Employing Karl Fischer Reagent. I. Nature of the Reagent, *Journal American Chemical Society*, vol. 61, 2407, 1939.
2. J. Mitchell, Determination of Moisture in Native and Processed Cellulose, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 12, (7), 390, 1940.
3. Almy, Griffin and Wilcox, Fischer Volumetric Determination of Water, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 12, (7) 392, 1940.
4. Wernimont and Hopkinson, The Dead-Stop End-Point as Applied to the Karl Fischer Method for Determining Moisture, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 15, (4), 272, 1943.
5. McKinney and Hall, Improved Electrometric Apparatus for Use with Karl Fischer Method for Determination of Water, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 15, (4), 460, 1943.
6. Fosnot and Haman, A Preliminary Investigation of the Application of the Karl Fischer Reagent to the Determination of Moisture in Cereals and Cereal Products, *Cereal Chemist*, vol. 22, 41, Jan. 1945.
7. Levy, Murtaugh and Rosenblatt, Micro-Determination of Water, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 17, (3), 193, 1945.
8. C. M. Johnson, Determination of Water in Dry Food Materials, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 17, (5), 312, 1945.
9. Grotlisch and Burstein, Determination of Moisture in Naval Stores Products, *Industrial and Engineering Chemistry*, Anal. Ed., vol. 17, (6), 382, 1945.

FIG. 1. Disinfector is made from a surplus army steam cleaner. Mounted on a light trailer, built from I-beams and a discarded Ford rear axle, it is easily maneuverable.

DDT—Steam Sprayer

By RAY B. FORMEISTER, Fresno, Calif.

A METHOD of solving the disinfecting problems for a cooperative group of dairy farms has been developed recently. This was worked out with a portable disinfector, invented by Mr. R. C. Hamilton, Bakersfield, Calif. It embodies both simplicity of design and economy in construction. (Fig. 1.)

A mixture of one pint of DDT and 20 gallons of water is used in the process. This passes through the coils of the cleaner where a steam pressure of 150 lb. per sq. in. is built up. Stalls, floors, walls, equipment and other infested areas are then ready to be sprayed. (Fig. 2.) It is particularly successful in reaching corners and places that are otherwise inaccessible and its maneuverability is a prominent feature.

The inventor states, "No germs or insects can live after being exposed to the combination of live steam and DDT. With this apparatus I have cleared out insects in barns that have withstood ordinary insecticides for ten years."

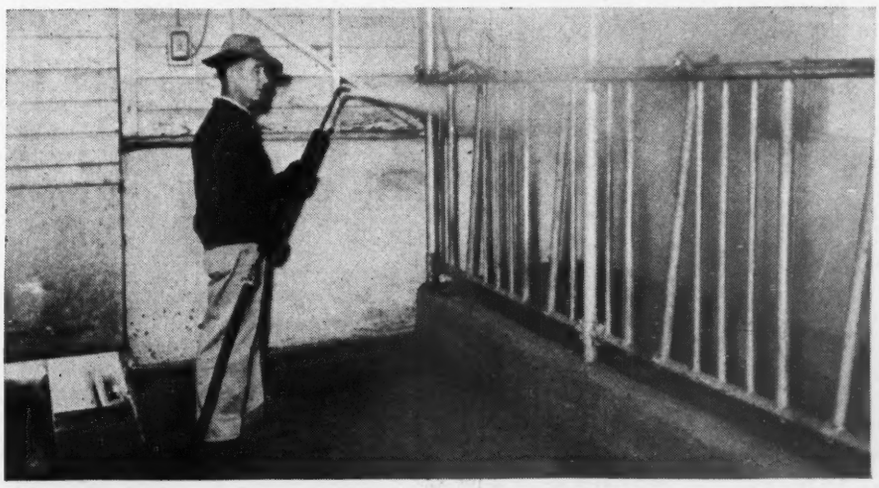


FIG. 2. Spraying the mixture, by means of a rubber insulated pipe, on the stalls in a dairy barn. It is said that this method will rid barns of lice and germs in half an hour.

ELECTRONIC HEAT

In the Food Industries*

By its application frozen products are defrosted rapidly with a minimum of bacterial multiplication. Bread is made mold free, cookies and meat are baked in a matter of minutes. Its cost and limitations are discussed

By V. W. SHERMAN, President
Sherman Industrial Electronics Co., Belleville, N. J.

THE results obtained from the application of electronic heat to food products have been usually unique and frequently valuable. Interest has grown and widened steadily in recent years and positive moves on a commercial scale already have been publicly announced. New problems are involved, differing from those to be found in the electronic heating used by other industries.

Before discussing the applications of electronic heat to the food industries, answers are needed, in plain layman language, to the following questions:

1. What is "electronic heat"? What's new, special or better about it? How does it work?
2. What is a high frequency generator? Is it new? Is it something old? Its service life? Its amortization life?
3. What additional equipment does an "application" require?
4. How about maintenance and operating cost of electronic heat equipment?

The answers to the above questions should establish the practicability of the new heating method and its equipment. We can then consider:

1. Results of electronic heating of bakery and food products.
2. What the "best bets" are for electronic heat.
3. Popular misconceptions of electronic heat.
4. A forecast of development.

What Is Electronic Heat?

Because electronic heat has two distinct forms we must think of it as two tools rather than one and then concentrate on the particular form in which we are interested.

The first form is induction heat that can be developed in conductors such as steel shafts and brass bushings. Here a coil of wire carrying high frequency current encircles the metal and heats its surface by induction.

The second form is known as dielectric heat because the product to be heated is a nonconductor or dielectric material, such as plastic, rubber, wood, fruit, chocolate, cakes, breads or biscuits. Food plants are, therefore, concerned with dielectric heat and practically all foodstuffs can be through-heated by this means. Here the product is carried on a belt between a pair of metal plates that are charged with high-frequency voltage. Industrial dielectric heating develops a temperature rise throughout the mass in exactly the same way as diathermy except for using higher power and being applied to commercial products rather than human tissue.

Dielectric heat is largely frictional heat and arises from the fact that each molecule of the foodstuff is being repeatedly stressed or distorted by the high voltage field. The direction of the electrical stress reverses with every alternation of the high-frequency voltage. Since we are moving, by this distortion, a tiny mass of material through a short distance, the repeated distortion of the particle constitutes work and this work appears as heat. A close mechanical analogy is the heating of a rubber tire brought about by the mechanical distortion of its particles as the tire rolls along the road.

The amount of heat created by each voltage reversal is small but in dielectric heating these reversals are occurring at a high rate; for example 27,000,000 times per second, and it

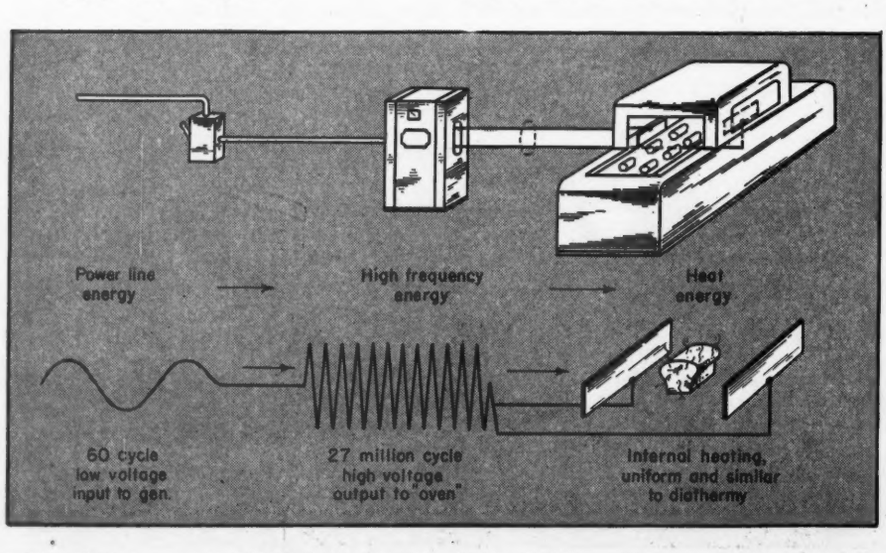

Power line energy
High frequency energy
Heat energy
60 cycle low voltage input to gen.
27 million cycle high voltage output to "oven"
Internal heating, uniform and similar to diathermy

FIG. 1. Electric current at 60 cycles is converted by the high frequency generator to 27,000,000 cycles. It is then fed to the special application equipment where it is applied as electronic heat.

*From a talk presented to the annual meeting of Independent Biscuit and Cracker Manufacturers, Palmer House, Chicago, Ill., January 25, 1946. Copyright S. I. E. Co., 1946.

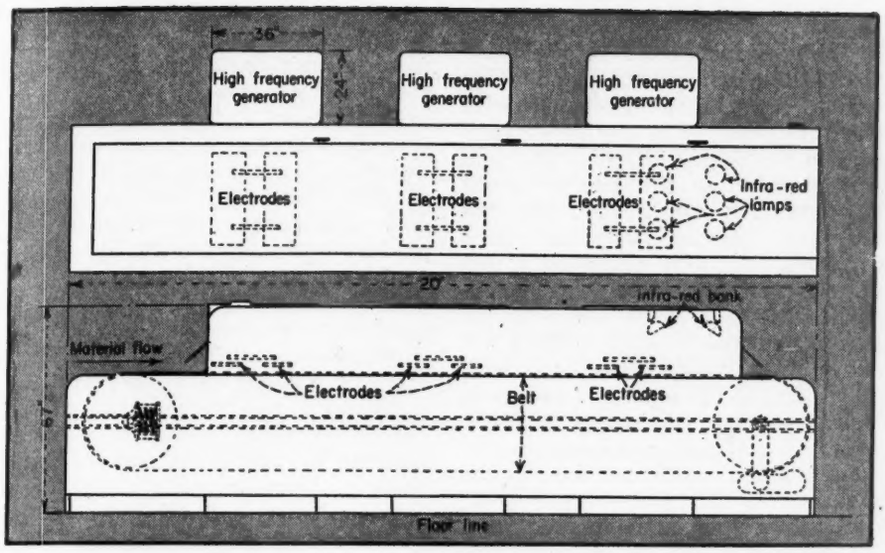


FIG. 2. SIECO-type 3009 electronic oven, designed to be used with a high frequency generator. It is equipped with infra-red lamps for browning crusts.

is this fact that accounts for the rapid temperature rise throughout a mass of foodstuff.

The different and better thing about dielectric heat, as compared to conventional heat, is its ability to convert each interior particle of foodstuff into a tiny heating element which experiences heating within itself and also can transmit this heat to adjacent particles or surfaces. Conventional surface heat, including infra-red lamps, all reach the center mass by slow penetration from an overheated surface layer.

It is important to note that, whereas all parts of the product experience dielectric heating, the metallic electrodes or applicator plates do not. Therefore substantially all of the generator's output appears as heat in the product and very little is lost as stray oven heat.

High Frequency Generators

We need not be confused by the fact that the heat source happens to be electronic. This only means that power tubes are used to convert ordinary 60-cycle power into high frequency power, which in turn is applied as dielectric heat to the product (Fig. 1).

High frequency generators are old. Their ancestry includes radio transmitters and diathermy units. Progressive manufacturers now offer units that are electrically simple and designed along machine tool lines. The best industrial electronic equipment has sound functional design, based on the elementary idea that it must serve the needs and wants of the user. They are fully automatic.

Output power commonly ranges from 3 to 25 kw., and output frequency up to 30,000,000 cycles per second.

A life of 10 years is a conservative estimate for well-built equipment, and an amortization period of seven years has been recommended.

Application Equipment

Equipment required in addition to the high frequency generator varies with the job to be done. Such jobs as cookie baking, mold inhibition, or package sterilization all call for a belt-type oven, similar in general appearance to a standard band oven but considerably smaller and equipped internally with proper electrodes and shielding to permit the application of dielectric heat to the product. Access doors to the heating area must be electrically interlocked, belt speed must be variable, and work heights coordinated to those of established machinery so that the electronic oven will fit into present production setups. The SIECO type 3009 electronic oven (Fig. 2), which meets these requirements, was designed for commercial bakeries.

Maintenance and Operating Costs

The maintenance problem is confined to routine inspection and the replacement of tubes (average life, 2,000 hours). Service cost records, based on several hundred high frequency generators ranging in output from 3 to 75 kw. and located throughout the East and Middle West, have indicated an average annual maintenance cost approximately five percent of the purchase price of the generator.

The total of all elements of operating cost rarely exceeds 10 cents per hour per kw. of output. A 3-kw. output unit costs about 30 cents per hour to operate whereas a 25-kw. output unit can be operated for only $1.30 per hour, which is less than 6 cents per hour per kw. of output.

The above figures have taken into consideration:

1. An overall electrical efficiency of 50 percent.
2. Conservative tube life of 2,000 hours.
3. Equipment life of 10—2,400-hr. work years. (300 days x 8 hours.)
4. Annual maintenance cost equal to five percent of purchase price.

The operating cost for electronic heaters up to 100 kw. is shown in Fig. 3. The curves are based on one make only and do not necessarily apply to all makes.

The selling price of high frequency generators varies considerably, as shown in Fig. 4. For a given power output, the selling price increases as the output frequency required by the job becomes higher. Dielectric heaters for food work require a high output frequency in the order of 13,000,000 to 30,000,000 cycles per second and must be well built to insure continuity of production. Small units range from $750 to $1,000 per kw., and larger sizes from $400 to $500 per kw. of output.

Applications

Electronic heating has been successfully applied to food products for their dehydration, cooking, melting, roasting, deinfestion, baking, defrosting and mold inhibition.

Certain applications are feasible only under special circumstances. Others are dubious and should not yet be recommended for development. Many of the applications, however, have been repeatedly tested and are

Commercial type of high frequency sterilizer. A. High frequency generator. B. Application unit.

known to possess both practicability and economic soundness. Some of the applications of electronic heating to food processing are discussed in this article.

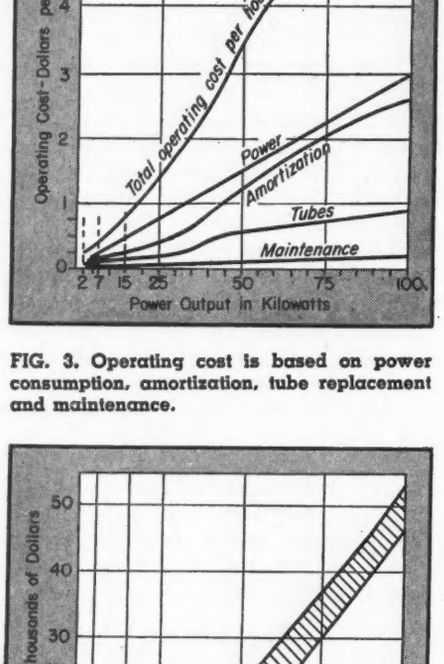


FIG. 3. Operating cost is based on power consumption, amortization, tube replacement and maintenance.

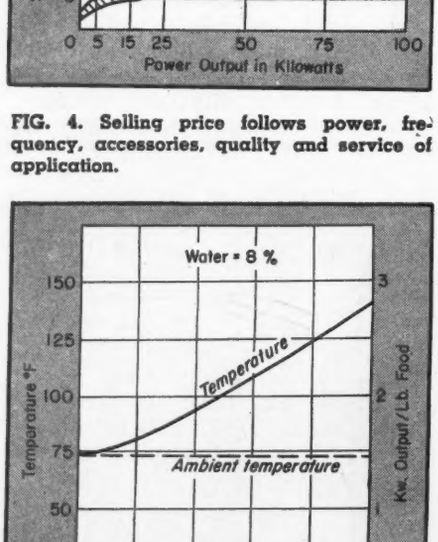


FIG. 4. Selling price follows power, frequency, accessories, quality and service of application.

Defrosting

Thirty-pound cartons of perishable fruits like strawberries and raspberries have been defrosted with electronic heat in a matter of minutes in contrast to the four hours in warm water or the one to seven days presently required at room temperature. Smaller two-pound cakes of frozen food were defrosted in less than one minute. Five-pound blocks of frozen eggs were defrosted in less than three minutes. All of the above jobs were accomplished with only 3 kw. of 13-megacycle electronic heat. Based on this work, a 25-kw. electronic defroster was designed to handle barrels of frozen food at the rate of 750 to 1,000 lb. per hour, depending upon initial temperature. Bakers, candy and ice cream makers all recognize the value of time, space, and handling savings to be effected, and also the reduction of spoilage and the retention of fresh flavor. From the health standpoint, electronic defrosting was the means of securing an exceptionally low bacteria count in eggs and similar products. This was not due to germicidal rays but rather to the speed of the process, which reduced drastically the time food suffered exposure to the atmosphere.

A large bakery may require the defrosting of 10,000 lb. of product per day. Many ice cream manufacturers use 40 to 50 barrels of frozen fruit a day. Defrosting times, ranging from 45 minutes to two hours, cover practical requests for equipment performance at this time, and we recommend a 30- to 40-minute treatment time so as to reduce the power requirement and the cost of the electronic heater, yet insure low bacteria count. Defrosting ovens for food applications require special mechanical and sanitary design to facilitate product handling and steam cleaning. Engineers can readily add to or modify basic equipment to fit special plant needs.

The special defrosting of bread, frozen to retain its freshness over a period of two weeks, has been successfully done with electronic heat. The appearance and taste of the product was judged to be equivalent to that of the fresh product.

Another application, somewhat related to defrosting, is the warming through of dough to promote rising. Most interesting, from the practical standpoint, was the reduction of required shortening, said to be made possible by the rapid and substantially uniform warming of the mass experienced with electronic heating.

Other successful defrosting applications have included eggs (40 lb./hr./kw.), chickens (30 lb./hr./kw.), and a wide variety of packaged frozen foods.

Cooking and Baking

With only 3 kw. or less of electronic heat, heavy cookies 3/8 in. thick by 3 in. in diameter, have been baked in 75 seconds. Fruit cake has been baked in glass dishes. Homogeneous foods such as meat loaf, diced vegetables, cored apples and many meal and flour products have been readily cooked. Interesting was the 5 lb. leg of lamb that was roasted perfectly in 30 minutes, gravy and all. This would have taken two to three hours in an ordinary oven.

Cooking or baking, however, is an art. That is to say, there is much more to it than time and temperature. It therefore follows that the application of electronic heat to these arts will require cooperative development. For example, the electronically baked cookie had no brown crust, its surface color was much

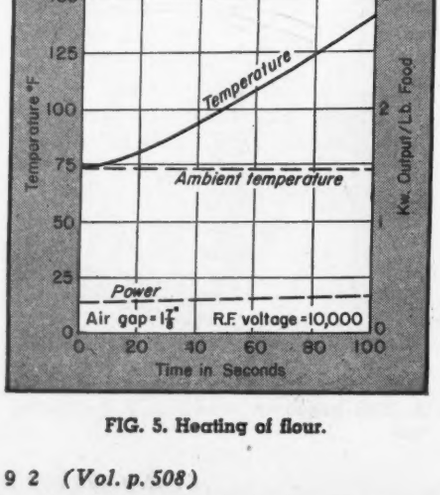


FIG. 5. Heating of flour.

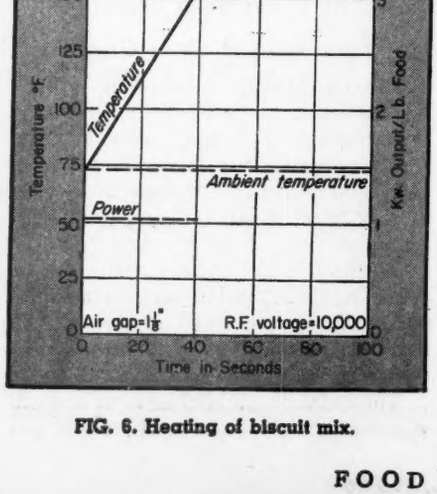


FIG. 6. Heating of biscuit mix.

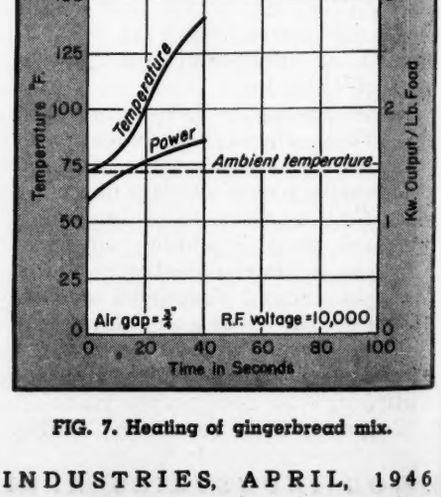


FIG. 7. Heating of gingerbread mix.

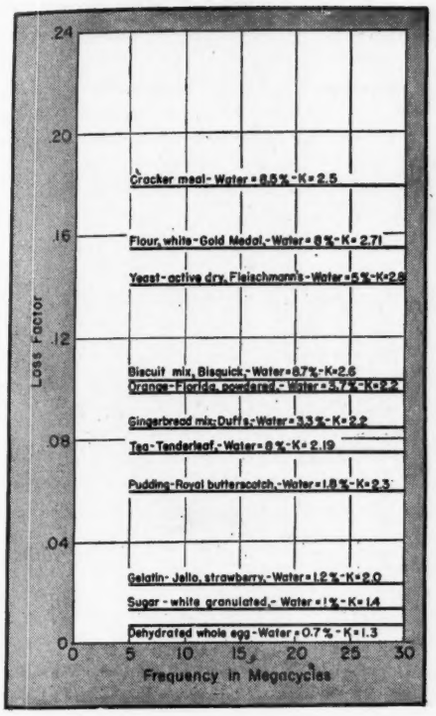

Loss Factor
Frequency in Megacycles
Cracker meal - Water = 8.5% - K = 2.5
Flour, white - Gold Medal, - Water = 8% - K = 2.71
Yeast - active dry, Fleischmann's - Water = 5% - K = 2.8
Biscuit mix, Bisquick - Water = 8.7% - K = 2.6
Orange - Florida, powdered, - Water = 3.7% - K = 2.2
Gingerbread mix, Duff's - Water = 3.3% - K = 2.2
Tea - Tenderleaf, - Water = 8% - K = 2.19
Pudding - Royal butterscotch, - Water = 1.8% - K = 2.3
Gelatin - Jello, strawberry, - Water = 1.2% - K = 2.0
Sugar - white granulated, - Water = 1% - K = 1.4
Dehydrated whole egg - Water = 0.7% - K = 1.3

FIG. 8. The electrical loss factor is practically constant over a wide frequency range.

the same as its interior. It was, of course, recognized that crusting could be readily added as a finishing operation, using infra-red lamps or electric strip heaters. In either case the overall baking time would be definitely reduced. Such necessary changes in baking technic must be decided by trial. The supply and adjustment of supplemental surface heat is a simple matter.

Melting

Chocolate, cocoa mixtures, sugar in several forms, starches, and other products can be melted with electronic heat. The rapid and substantially uniform heat was of real advantage. In certain cases special fixture design was required because of the product's tendency to foam. This was the case with dextrose and lump sugar. On the other hand, sugar sirup and chocolate do not foam, nor does starch, which rapidly is reduced to a jellylike mass with electronic heat. When the product to be heated has both lumps and powder, the lumps may be expected to heat about twice as fast as the powder.

Mold Inhibition

This is an excellent application and has produced positive results. Whole wheat bread, Boston brown bread and white bread so treated remain mold free for over two weeks, whereas an untreated or "control" loaf showed mold before the end of the second day. The protective treatment was given directly after wrapping and sealing the loaf in cellophane. Electronic heat was required to develop the temperature of 140 deg. F. uniformly throughout the loaf in a matter of seconds. The small amount of moisture that condensed on the inside of the cellophane wrapper during heating was quickly reabsorbed by the loaf during the cooling-off period. The treated product suffered no change of texture or taste nor was any expected in view of the low temperature used.

Other Applications

Other applications of electronic heating to the food industries are caramelizing, dehydrating, deinfesting, popping and sterilizing. Work in the food field has covered a long list of products ranging alphabetically from apples to yeast and including birdseed, candy, cereal, cinnamon, corn, eclairs, gelatin, licorice, malt, meats, muffins, nuts, potatoes, spices, and starch.

Figures 5, 6 and 7 show how white flour, a prepared biscuit mix, and a gingerbread mix, respectively, responded to electronic heating that was applied as a protection against infestation. Although each food responded in a somewhat individual manner it may be noted that if the power had been adjusted to exactly one kilowatt in each case, then the 75 deg. temperature rise would have been accomplished in substantially the same time (40 to 45 seconds) for each one-pound sample. In a commercial installation, where radiation and fixture losses are negligible, compared to energy in the product, we would experience almost double this heating rate per pound for each kilowatt of applied energy.

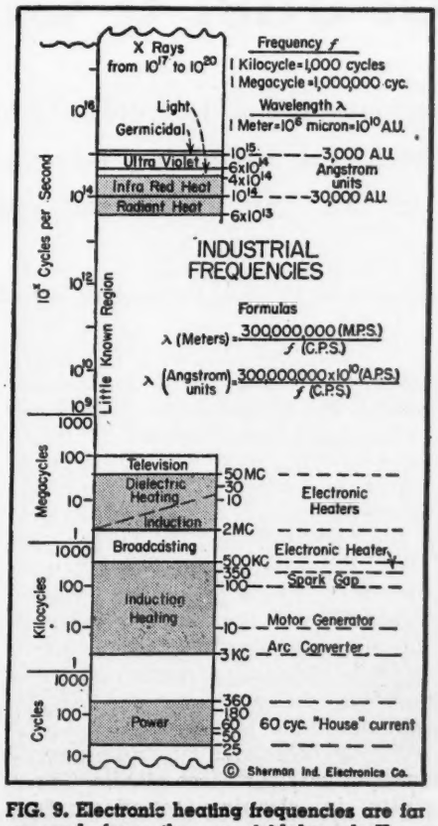


FIG. 9. Electronic heating frequencies are far removed from the germicidal and X-ray frequencies.

"Best Bets" for Electronic Heat

"Best bets" mean money makers, and in production this is synonymous with time, space or material savings. For the bakery the following are felt to offer the most immediate value:

1. An electronic baker for baking thick cookies either completely or at least during the early stages so as to strike through and initiate heating of the core.
2. An electronic mold inhibiter for packaged goods. Such an oven would be quite similar to the electronic baker.
3. Electronic defroster for frozen fruits and eggs.

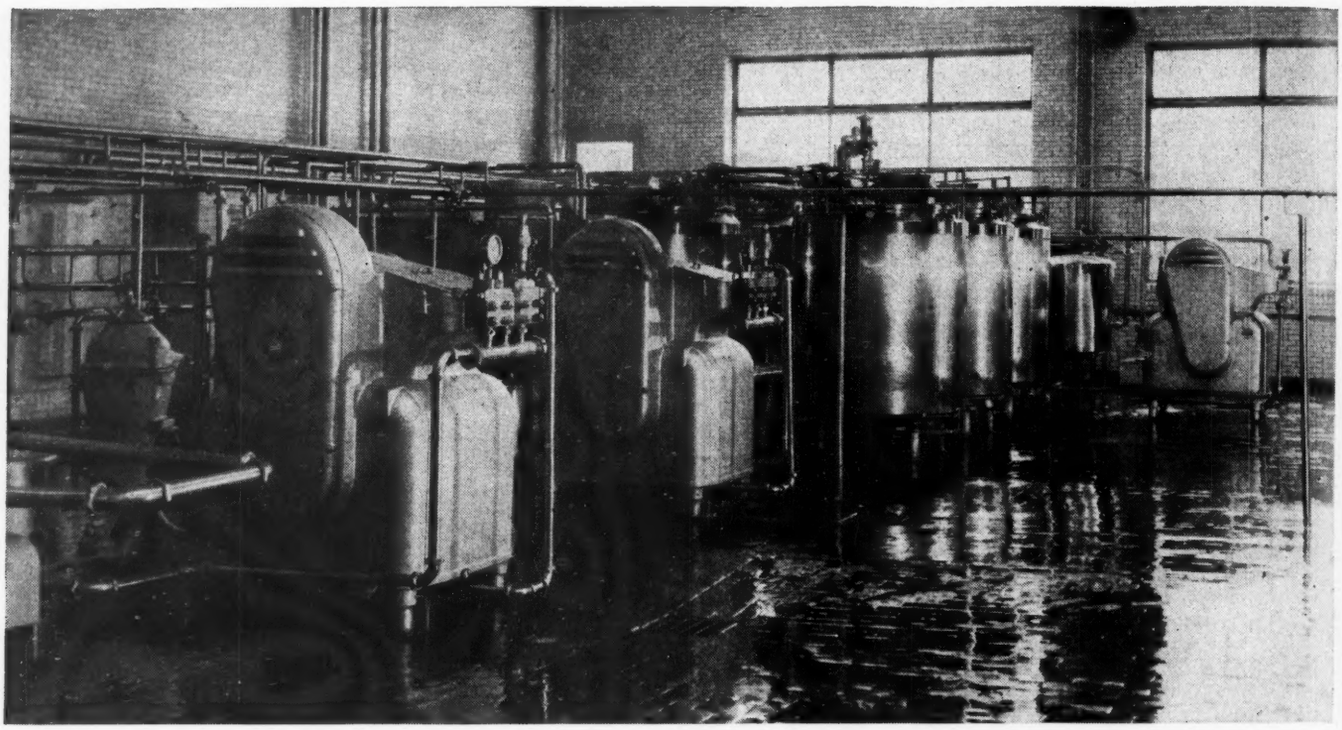
Popular Misconceptions

The over-glamorizing of electronics by "popular" writers has not been helpful. Electronic heaters and their ovens or fixtures are plain production tools with a proven and important place in our industrial scheme. They have developed rapidly during the last fifteen years and have gained ground steadily by virtue of their outstanding merit for certain types of work. Numerous applications are impossible by any other means, and certainly the through-heating of food products is high on this list.

Many extravagant and unfounded statements about electronic heating have been publicized by well-meaning but not too well informed persons. Many such statements were attempts to clothe a personal hope or fear in scientific garb and so impress the layman. Some of the hopeful ones may possibly be fulfilled by advances in electronic art. To make use of electronic heat today, however, we must discard the following ideas as either downright fanciful or at least of no proven basis.

1. That for each material there is one special frequency that produces super results not possible at a frequency slightly different.
2. That higher frequency will always give better results.
3. That there is something magic about B.t.u. of electronic heat.

(Turn to page 212)



The easily drained floor and readily cleansed tile walls in this high-ceilinged room make the sanitizing and cleaning of these homogenizers and milk storage tanks a relatively simple job, if the assigned staff has the needed "know-how."

FOOD PLANT SANITATION Is Not Just a Chore

PART II — Last month, pest elimination and control, the first of three essential sanitary practices, were discussed. The remaining two phases, housekeeping and antisepsis, are presented in this final installment on food plant sanitation

By M. E. PARKER, Counselor in Food Production Development, Chicago

CLEANING and sanitizing operations of food processing and handling equipment are the burden of every food plant operator. Too often they are relegated to the status of a "chore" with the admonition to "let George do it." And, too often, George has tried to do the job with what he was supplied. This might be a barrel or two of washing powder, a few brushes, maybe a scoop and a pail, but with no specific instructions or supervision.

It is difficult to understand why a food manufacturer will spend freely to obtain the most effective equipment and then leave the cleaning of this equipment to an unskilled employee, or at best rely on the recommendations of a salesman of supplies.

One possible explanation is ignorance of the need for food plant cleaning practices. The existing indifference appears to have grown out of the fact that cleaning agents, too often, are confined to compositions containing those chemicals whose manufacture is the major interest of the company supplying the "cleaners." A chemical manufacturer engaged in the production of caustic soda and soda ash, for example, is obviously interested in finding markets and uses for these alkalis. Their utility in cleaning practices frequently is more apparent than real. Actually, soda ash and bicarbonate of soda are ingredients, often in excessive proportions, of many detergents and cleaning compositions in which they not only dissipate cleaning action, but are of debatable value, to say the least. In fact, the presence of carbonates and bicarbonates usually dissipates the cleansing action of essential chemicals in the cleaners. Furthermore, they increase the staining or scale producing characteristics of the wash water, whether it is used for washing or for rinsing.

In the processing of milk, for example, the problem of milkstone is of considerable concern both in meeting

public health requirements and in quality control programs. Milkstone has its origin in the calcareous deposits originally formed through precipitation of minerals from the wash water by the chemicals used for cleaning and rinsing equipment and utensils.

A Chemical Problem

On the basis of ignorance or indifference, it appears that the food processing industry may be relying on an alibi in permitting ineffective cleaning compounds to be used in its sanitary practices. Perhaps, the real reason is found in the failure to consider the physical cleaning of equipment and utensils as a chemical problem (disregarding their sanitizing for the moment). Actually equipment cleaning is primarily a chemical problem. In all cleaning practices, water is the common factor. It is the vehicle that carries the cleaning agent or agents in soluble form. It is also the vehicle that must carry away the soiling substances, loosened and liberated by the detergency of the cleaning agent in aqueous solution. Crystal clear and innocuous as it will invariably appear, the wash water used in cleaning food-processing equipment is never "pure" in a chemical sense, as is, for example, distilled or de-ionized water. The food plant operator must be made to understand that his wash water is a complex chemical reagent. It varies with its source and sometimes it varies even from the same source. It has to be considered before any intelligent use can be made of another chemical compound, such as the washing powder or detergent composition. It is also necessary to know the type of soil to be removed before an effective detergent can be obtained.

The food manufacturer must consider, also, the possible effects when the water, used to prepare a cleaning compound solution, is further used for rinsing the cleaned surface. Any staining or spotting characteristics it may show cannot be disregarded because they can provide the starting point of truly serious deposits, such as the milkstone deposits on milk and dairy utensils and equipment, or the corrosive attack on tinplate in canning operations.

Evidence that progress is being made in detergent technology is found in the use of polyphosphate salts. They are used in detergent compositions for mechanical dishwashing to reduce and to prevent staining of dishes due to an adherent film of calcium salts. In the absence of these salts, this film builds up rapidly on repeated washing, especially with water of total hardness exceeding 10 gr. per gal. Unfortunately, grease and microorganisms are entrapped in such films. The use of polyphosphates and some of the newer chemicals reduces the film-forming tendencies and facilitates effective grease removal, resulting in a more sanitary condition of the equipment and utensils.

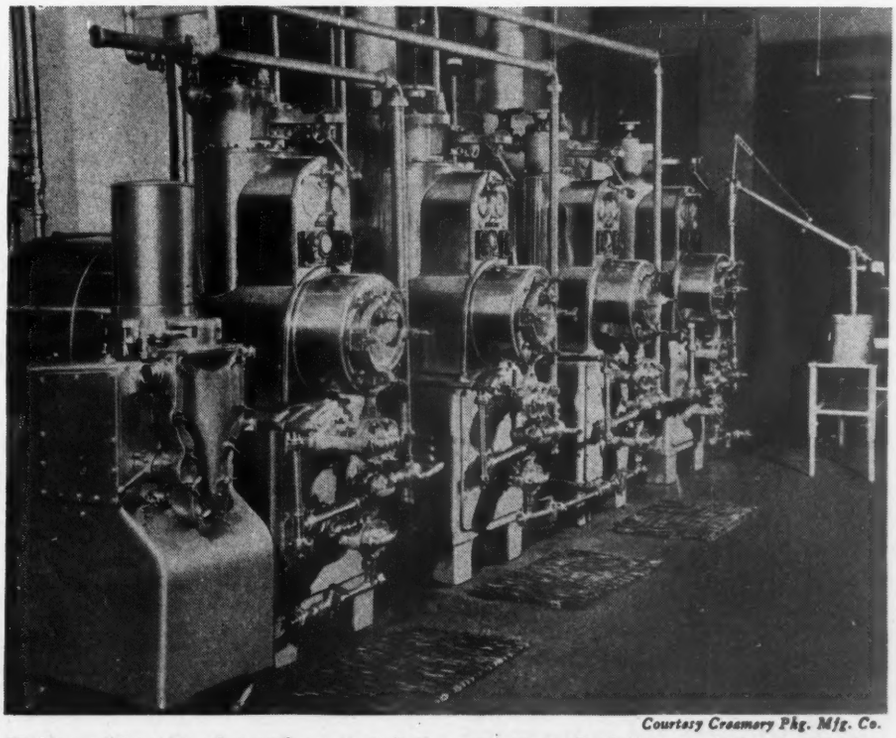
The effectiveness of these salts is shown in a study to determine the relative efficiency of the sodium polyphosphates in preventing such film formations. Tests were made in a domestic type mechanical dishwashing machine to simulate actual conditions encountered in practice. The polyphosphates tested were technical sodium hexa-metaphosphate, tetra-sodium pyrophosphate, sodium tetraphosphate and sodium tri-polyphosphate. To carry out the tests, glass plates, 6 in. sq., were soiled on one side with 2 to 3 g. of a mixture containing two parts finely ground peanut butter, one part lard and one part butter. These soiled plates were then washed for five minutes at 135 to 140 deg. F. in a solution containing ½ oz. of detergent in a gallon of water of 17½ gr. total hardness. The plates were then rinsed with 145 to 150 deg. F. water and air dried. The other sides of the plates were similarly soiled and the washing and rinsing operations were repeated. Each plate was subjected to 15 such washings and rinsings. The plates were then stacked and placed on a black background to compare their stainings. The effectiveness of the polyphosphate, tested in the particular water and under the conditions specified, were found to be in the following order:

1. Sodium tripolyphosphate.
2. Sodium hexa-metaphosphate.
3. Sodium tetra-phosphate.
4. Tetra-sodium pyrophosphate.

Stains Vary

Incidental to the making of these tests was evidence of an evolution in staining. A streaking type of stain appeared when a deficiency of polyphosphate was used. This streak appeared to be a washing stain formed from adherent calcium soap films. As the amount of polyphosphate was increased, the stain changed to a dispersed type that appeared to be a rinsing stain. As the percent of polyphosphate was further increased, the stain eventually disappeared. In this manner the sodium tri-polyphosphate showed greater efficiency in eliminating staining characteristics than did the other polyphosphates. We must emphasize, however, that such results are specific and cannot be used too freely for drawing any general conclusions.

Again, these results are only straws in the wind of detergent tech-



Courtesy Creamery Pkg. Mfg. Co.

Modern equipment, adequately protected, is a major contribution to sanitation in this ice cream plant. Note the protective rubber floor mats and the sanitary fruit feeder on the left.

Courtesy Bowman Dairy Co.

Staining or spotting characteristics of the water, used for rinsing, may not be disregarded as they provide the starting point for milkstone deposits, as shown here, or for the corrosive attack on tinplate in canning.

nology. Also, one must keep in mind that cleaning compositions, which are specific for certain waters, are not necessarily applicable to all types of waters used as their solvents or vehicles. Furthermore, the type of soil to be washed and rinsed away, the character of equipment or utensil surface to be cleaned, the staining characteristics that appear only after repeated washings and rinsings and the dissipating influences of certain chemicals upon the detergent powers of certain other essential chemicals are among some of the more important factors to be considered in the development of effective detergents. Yet, all of their properties are either enhanced, dissipated or unaffected by the chemical character of the wash water, which is their vehicle.

Surveys and analyses of quality control problems are the keys to the development of a cleaning technology that will be the tool of every food technologist, every sanitarian, and every governmental regulatory officer, as well as every food plant production manager. A working sanitary program will involve more than mere water analyses, making of surveys, working out specifications and the like. It involves that very important and vital obligation to teach cleaning technology to the directors of research and production development departments and to the operatives and employees of the processing and production departments. The development of an effective cleaning technology is truly a challenge to the ingenuity of the food processing industry and the allied trades serving it.

Sanitizing (Antisepsis)

Antisepsis is always the ultimate goal in the attainment of sanitation as far as food-contact surfaces are concerned. Such practice is, of course, essentially precautionary and is insurance against contamination of the cleaned surface prior to their contact with the food product.

As long as chlorine is the essential bactericidal chemical, it must be bought on the basis of its ability to destroy microorganisms. This means simply the purchase of the maximum amount of chlorine at a minimum cost. Future possibilities, however, may change such simplicity of procurement and application because many compounds are being developed that will prove highly competitive to chlorine.

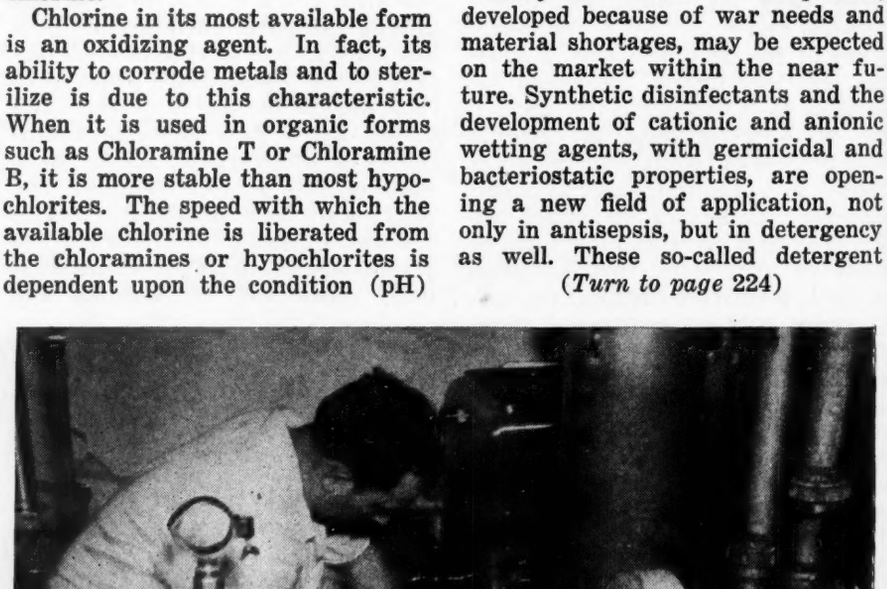
Chlorine in its most available form is an oxidizing agent. In fact, its ability to corrode metals and to sterilize is due to this characteristic. When it is used in organic forms such as Chloramine T or Chloramine B, it is more stable than most hypochlorites. The speed with which the available chlorine is liberated from the chloramines or hypochlorites is dependent upon the condition (pH) of the solution. In an alkaline reaction, all of the so-called available chlorine is not readily available, yet it is released rapidly when the solution is made acid. In fact, the sterilizing action of chlorine germicides is determined by:

1. The reaction (acid or alkaline) of the solution in which it is used.
2. The amount of organic matter in the water in which it is dissolved.
3. The temperature of the solution.
4. The length of time the solution is allowed to be in contact with the surface to be sterilized as well as the degree of penetration that it can effect.

Many of the high-test hypochlorites have heretofore been available in insoluble forms, which have required considerable handling and preparation on the part of the user. A soluble lithium hypochlorite, of extremely high available chlorine content, eliminates many of these disadvantages and may become available at a practical cost as the supply increases.

Many new chemical compounds, developed because of war needs and material shortages, may be expected on the market within the near future. Synthetic disinfectants and the development of cationic and anionic wetting agents, with germicidal and bacteriostatic properties, are opening a new field of application, not only in antisepsis, but in detergency as well. These so-called detergent

(*Turn to page* 224)



In a task, such as the dismantling of this positive pump to remove milkstone, the important difference between a "chore" and a competent job rests wholly on staff training.

"Undercooling" Retards Freezing of Canned Foods*

Freezing point data on canned and bottled foods are of permanent value to technologists, foods processors and shippers. This is Part I of data sheets showing the extent of undercooling, freezing points, and effect of freezing on canned goods. Parts II to VI will follow

NEW DATA are now available on the freezing points of canned and bottled goods, which will facilitate storage and shipment in cold weather. The data were obtained in the last year of the war, when transportation emergencies revealed the need for accurate information on the effect of holding these commodities at abnormally low temperatures for short periods. In consequence, the U. S. Department of Agriculture undertook an exhaustive investigation of the problem, establishing the freezing points of a wide variety of canned foods and the time taken to freeze under various conditions.

The research showed that the well-known phenomenon of undercooling or supercooling almost always saves the fruits and vegetables from immediate damage, when exposed for short periods to temperatures well below the freezing points of the material in the cans. The true freezing points, however, must be taken into consideration whenever storage is prolonged. The findings have direct peace-time application, and will enable canners, wholesalers, cold storage operators and common carriers to handle these commodities in freezing weather with greater assurance, since they can predict how soon freezing is likely to occur.

Of Permanent Value

The data are considered important. FOOD INDUSTRIES will publish them as completely as possible, in both chart and tabular form. The data on applesauce, asparagus and various kinds of canned beans appear in this issue. Other commodities will be included in succeeding issues in special data sections, convenient for filing for permanent reference.

All of the commodities exhibited the phenomenon of undercooling under the test conditions, which duplicated commercial practice as closely as possible. The fact that undercooling took place made it relatively easy to determine the true freezing points. This is in line with the standard laboratory method of establishing the freezing point of a water solution of an organic or inorganic substance, or biological fluid, as discussed in standard textbooks of physics, chemistry and biochemistry.

When fruit, vegetable or animal tissues, or products made from them, are held at temperatures below their freezing points, they cool gradually rather than suddenly, and finally freeze if the temperature of the surroundings is low enough. Prior to actual freezing, however, the solutions or tissues usually become undercooled below their freezing points without the formation of ice. The undercooling can be stopped and the solution or substance caused to freeze by any disturbance, such as a jar or jolt, which will start crystallization or ice formation. Ice crystals will eventually appear whether or not the substance is shaken. When ice crystals do appear, the temperature of the solution or tissue will rise suddenly, and may remain fairly constant for hours. It will finally fall when the surroundings are cold enough and the material freezes solid.

In the case of the data sheets, the highest temperature reached after the end of the undercooling was regarded as the freezing point of the commodity. The sequence of undercooling, temperature rise, and leveling off at the freezing point can be readily seen in the chart for applesauce, the first of the series.

Effect of Undercooling

Undercooling does no harm to processed plant or animal material if ice crystals do not form. This means that the undercooled material must be allowed to warm up again before the probable time when freezing will take place, which can be found from the charts. They show an appreciable interval between the time the canned goods reach the freezing point, and the time of actual freezing or ice formation. Undercooling protects the material for a longer period if the cans are motionless than if the cans are jolted.

The cooling curves were all obtained on commercial cans or bottles fitted with thermocouples, which gave the actual freezing temperatures of the contents. Air temperature also was recorded by a thermocouple, checked against a mercury thermometer. The freezing was done in a brine-refrigerated room held at the following temperature ranges: 15 to 18 deg. F., 9 to 12 deg. F., 7 to 10 deg. F., and —3 to —6.6 deg. F. Some of the cans were motionless. Others were fastened to a jolting apparatus, designed to simulate the motion of a railroad car. Readings were taken every 15 minutes. Samples were tested twice, three times, or four times.

Two-hour Protection

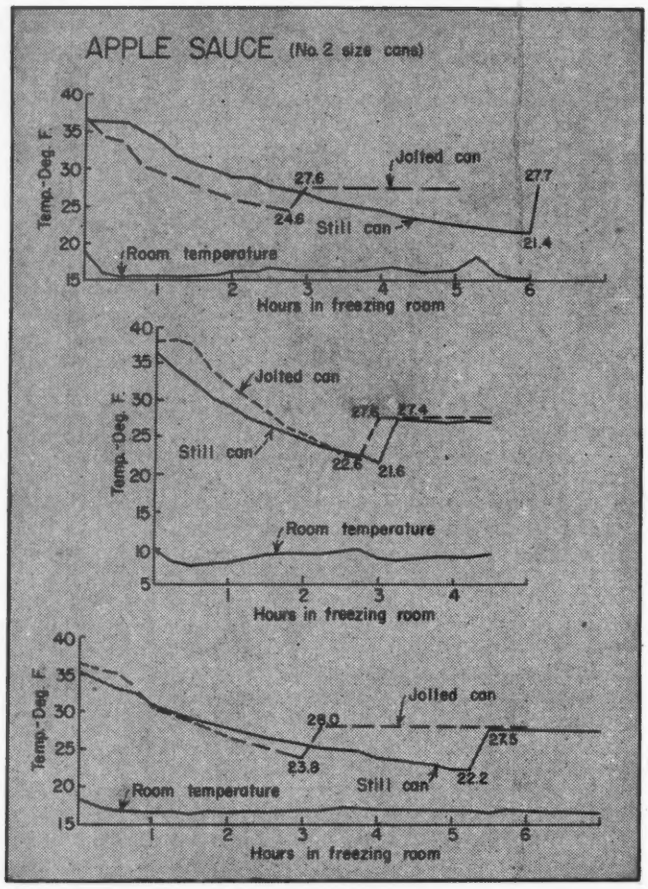
At 15 to 18 deg. F., the still cans, on the average, undercooled for more than two hours, and the jolted cans for an hour. This is a considerable period of protection against frost damage. Even in the 7 to 10 deg. F. range, there may be an hour's leeway between freezing temperature and actual freezing of the can contents. Under certain conditions, the can contents may undercool nearly 10 deg. without damage.

When the commodities are to be held at low temperatures for long periods, the effect of undercooling will not protect them, and the true freezing points must be taken into account, as given in the data sheets.

*Based on a preliminary report by D. H. Rose, Division of Fruit and Vegetable Crops and Diseases, and H. D. Johnson, Office of Distribution, War Food Administration. Further acknowledgments are included in the data sheets.

Freezing Point Data Sheets And Cooling Curves

PART I



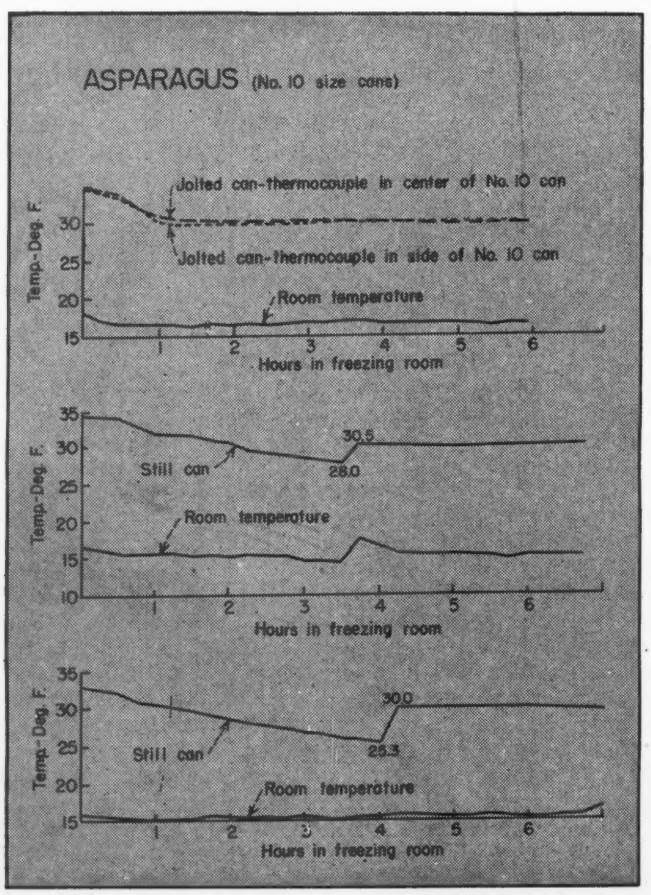
Apple Sauce

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	15.3-18.2	36.4	2¾	3¼	6.3	6	27.7
1—Jolted .	15.3-18.2	36.6	1½	1¼	3.0	2¾	27.6
2—Still ...	8.0-10.1	36.7	1¼	2	5.8	3¼	27.4
2—Jolted .	8.0-10.1	38.0	1½	1¼	5.0	2¾	27.6
3—Still ...	15.9-17.1	35.3	2	3½	5.2	5½	27.5
3—Jolted .	15.9-17.1	36.5	1½	1¾	4.2	3¼	28.0

Freezing temperature range 27.4°F. to 28.0°F.; average, 27.6°F.

Inspection of apple sauce in jolted cans, immediately after each test, showed the contents to be frozen stiff approximately ½ in. around edge of cans, while in the center of cans it was slushy. Inasmuch as the still cans undercooled and froze at about the same temperature as the jolted cans, it is presumed that the still cans froze to about the same extent.

Freezing showed no effect on apple sauce.



Asparagus

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
No. 10 size cans:							
1—Still ...	15.9-18.5	35.5	2¾	¼	0.1	2	30.0
2—Still ...	14.9-16.9	32.9	1¼	3	4.7	4¼	30.0
3—Still ..	14.7-15.9	34.4	2	1¾	2.5	3¾	30.5
4—Jolted .	15.9-18.3	35.3	1¾	¾	0.2	2½*	30.6
4—Jolted .	15.9-18.3	35.3	1¼	1¼	0.3	2½**	30.3
5—Still ...	15.9-17.1	63.3	4	2¾	6.4	6¾	30.3
5—Jolted .	15.9-17.1	60.2	2½	1¼	4.1	3¾	30.4
6—Still ...	5.6-13.9	37.1	1½	2¾	7.9	4¼	30.1
6—Jolted .	5.6-13.9	37.1	1½	½	0.1	2	29.7
7—Still ...	6.4- 7.7	38.3	1	1¾	7.6	2¾	30.1
7—Jolted .	6.4- 7.7	49.9	2	¾	0.1	2¾	30.2

*Thermocouple inserted in the top center of the can.
**Thermocouple inserted in the top of can, approximately ½ in. from the rim.
Freezing point range, 29.7°F. to 30.5°F.; average, 30.2°F.

Hard frozen sample was shriveled in appearance. After thawing the stalks were limp and pliable but the flavor was satisfactory.

In test 4, thermocouples were inserted at the two different positions to determine whether there was any difference in the rate of freezing. The total time required to freeze was the same at both positions.

Hard Frozen Samples

The inspection of hard frozen samples was made by the Processed Products Standardization and Inspection Division, Fruit and Vegetable Branch, U. S. Department of Agriculture.

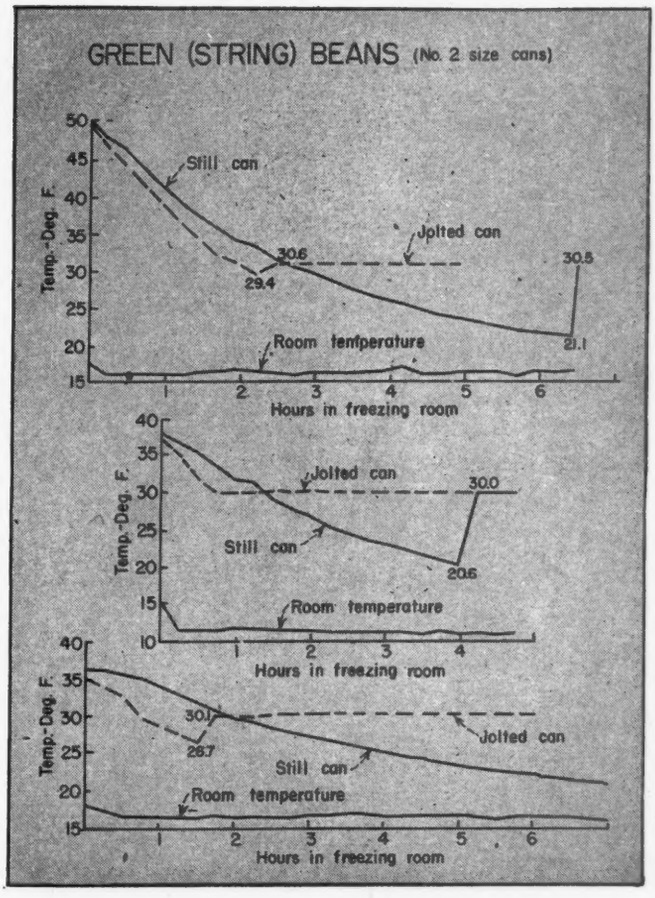
Green (String) Beans

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	15.9-17.3	36.4	1¾	5½	9.9	Did not freeze	
1—Jolted .	15.9-17.3	35.3	¾	1	3.4	1¾	30.1
2—Still ...	11.1-11.9	38.2	1¼	3	9.4	4¼	30.0
2—Jolted .	11.1-11.9	37.3	¾	¼	0.1	1	30.2
3—Still ...	15.9-17.1	50.6	2¾	4	9.4	6¾	30.5
3—Jolted .	15.9-17.1	49.9	2	½	1.2	2½	30.6

Freezing point range, 30.1°F. to 30.6°F.; average, 30.3°F.

Inspections of the beans were made immediately after each test, showing the liquid in the cans and the beans hard frozen to depth of approximately ½ in. around the sides of the cans, while in the center of the cans there was a heavy slush.

The hard frozen sample showed some tendency to slough and was somewhat less crisp than the unfrozen sample.

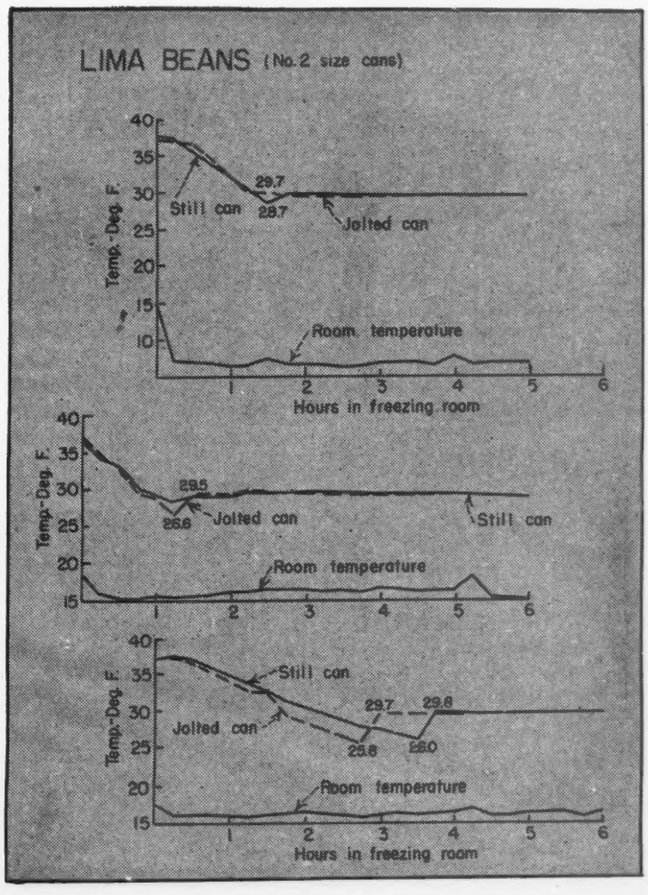


Lima Beans

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	15.1-18.2	37.0	1	½	0.9	1½	29.1
1—Jolted .	15.1-18.2	37.3	¾	¾	2.1	1½	29.5
2—Still ...	15.9-17.2	37.1	2¼	1½	3.8	3¾	29.8
2—Jolted .	15.0-17.2	37.2	1¾	1¼	3.9	3	29.7
3—Still ...	6.4- 7.5	37.6	1½	¼	1	1¾	29.7
3—Jolted .	6.4- 7.5	37.2	1¾	½	0.1	2¼	29.7

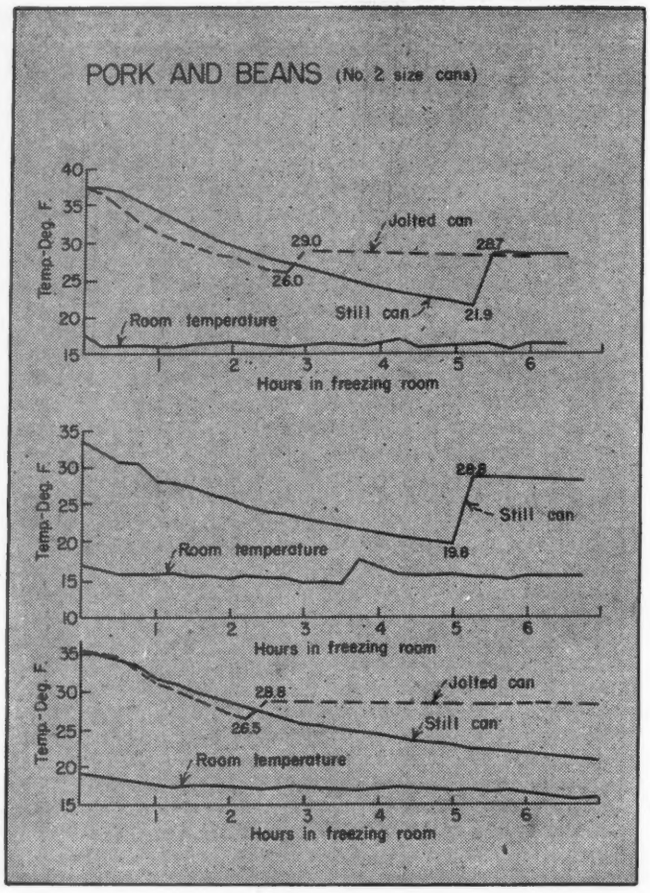
Freezing point range, 29.1° F. to 29.8° F.; average, 29.6°F.

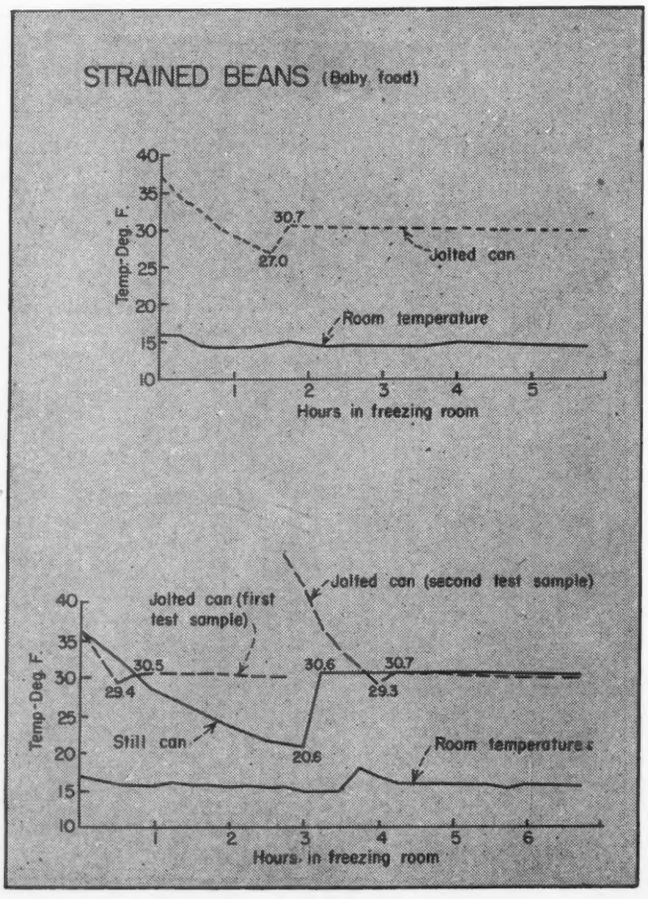
Inspection was made immediately after the tests and showed the liquor in the can frozen to a heavy slush.



Brands Listed

Various commodities in tin cans and glass jars and bottles were furnished for the tests by the National Canners Association, Washington, D. C., General Foods Company, New York, N. Y., Great Atlantic and Pacific Tea Company, New York, N. Y., H. J. Heinz Company, Pittsburgh, Pa., and Kraft Cheese Company, Chicago, Ill.





Freezing Point Data Sheets

PART I—Cont.

Pork and Beans

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	15.9-18.5	35.8	2	5½	8.1	Did not freeze	
1—Jolted .	15.9-18.5	35.8	1¾	¾	2.3	2½	28.8
2—Still ...	14.7-17.9	33.6	1	4¼	9.0	5¼	28.8
3—Still ...	15.9-17.1	37.3	2½	3	7.8	5½	28.7
3—Jolted .	15.9-17.1	37.4	1¾	1¼	3.0	3	29.0

Freezing point range, 28.7° F. to 29.0°F.; average, 28.8°F.

Inspections were made immediately after the test and showed the contents frozen stiff.

Hard freezing showed no effects on pork and beans.

Strained Beans (Baby Food)

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
1—Still ...	14.7-17.9	36.5	¾	2½	10.0	3¼	30.6
1—Jolted .	14.7-17.9	36.5	½	¼	1.1	¾	30.5
1—Jolted .	14.7-17.9	45.9	1	½	1.3	1½	30.7
2—Still ...	14.5-16.1	37.3	¾	1	3.7	1¾	30.7

Freezing point range, 30.5°F. to 30.7°F.; average, 30.6°F.

Inspection was made immediately after the tests and showed the contents frozen stiff.

Hard frozen sample showed considerable separation of liquor. Color and flavor unaffected.

Freezing Point Range

The tables give a range of freezing points for each type of commodity. Differences in freezing points in the tests are attributed to variations in composition from brand to brand.

Wax Beans

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling hr.	Undercooling deg.	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	16.3-16.9	36.0	1¼	1½	3.7	2¾	30.5
1—Jolted .	16.3-16.9	34.5	½	1	4.4	1½	30.0
2—Still ...	11.3-11.9	38.0	1½	¼	0.1	1¾	30.6
2—Jolted .	11.3-11.9	36.7	½	½	2.1	1	30.5
Glass jars:							
3—Still ...	-1.3*- -2.7*	38.8	1¾	¼	0.1	2	30.2
3—Jolted .	-1.3*- -2.7*	38.6	½	1	0.1	1½	30.0
4—Still ...	-7.2*- -8.6*	34.2	½	...	...	½	....
4—Jolted .	-7.2*- -8.6*	34.1	¼	...	...	¼	....
5—Still ...	15.3-16.6	35.7	¾	1½	0.4	2¼	30.3
5—Jolted .	15.3-16.6	37.1	¾	1½	0.3	2¼	30.2
No. 2 size cans:							
6—Still ...	15.9-17.1	61.0	3½	3¼	7.7	6¾	30.0
6—Jolted .	15.9-17.1	61.0	2¾	¾	1.3	3½	30.2

Freezing point range, 30.0°F. to 30.6°F.; average, 30.3°F.

***Observations made at below zero temperatures on wax beans, packed in glass jars:**

In a room temperature of —1.3 to —2.7 deg. F.

½ hr. The jar on the jolting machine showed ice crystals.

1¾ hr. The still jar showed ice crystals.

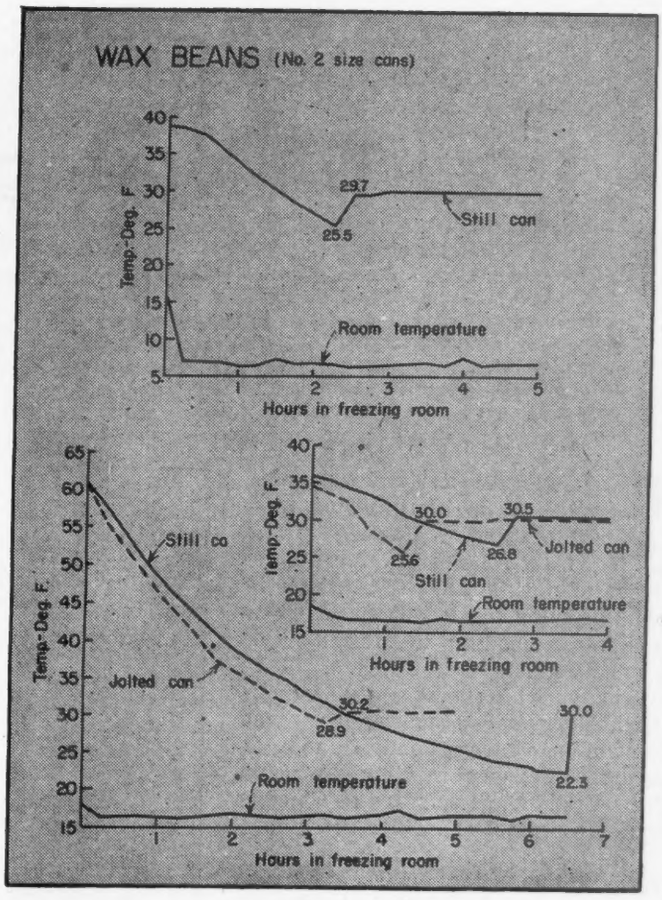
6 hr. The jar on the jolting machine cracked. The still jar did not break, but the cover was bulged.

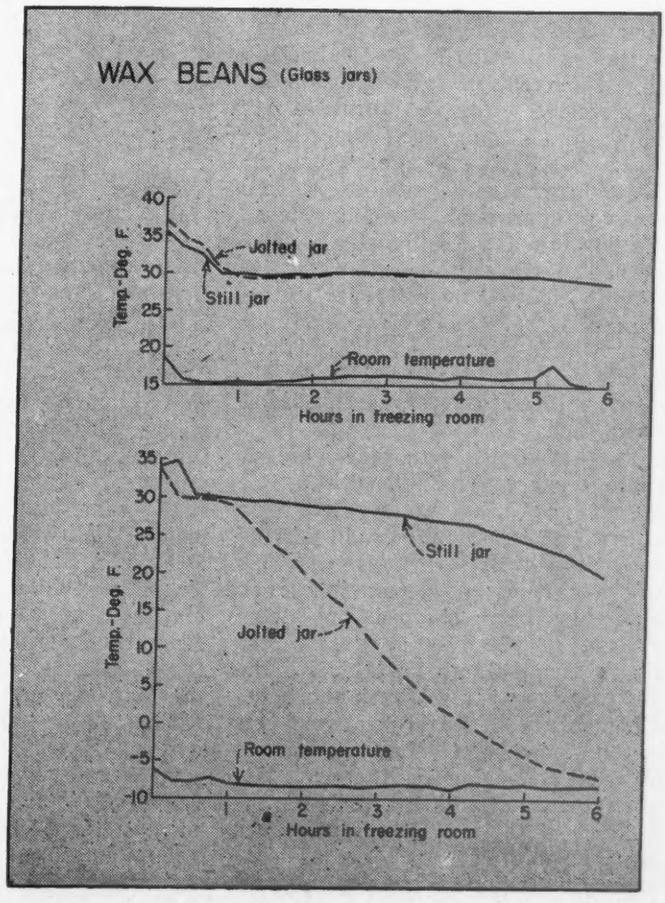
In a room temperature of —7.2 to —8.6 deg. F.

½ hr. Ice crystals formed in the upper half of the jar, in both jolting and still samples.

3¾ hr. The jar on the jolting machine was frozen solid and the jar was broken at the bottom.

4¼ hr. The jar standing still was frozen solid, with the jar bottom broken.





Acknowledgments

This research, an exhaustive investigation of the freezing of canned goods, was conducted by D. H. Rose, senior physiologist, Division of Fruit and Vegetable Crops and Diseases, U. S. Department of Agriculture, and H. D. Johnson, transportation specialist, Transportation, Rates and Services Division, Office of Distribution, War Food Administration. M. N. Weatherhead, assistant mechanical engineer of the Fruit Growers Express Company, assisted the government officials in the investigation, which was conducted at the experimental cold storage laboratory of the Plant Industry Station, U. S. Department of Agriculture, Beltsville, Md.

Cold Trucks Cover State Delivering Sausage

Water ice refrigeration is used by Mickelberry's for its fleet of 30 trucks, used to deliver the company's product throughout most Illinois and part of Indiana. Its two-day delivery is highly efficient

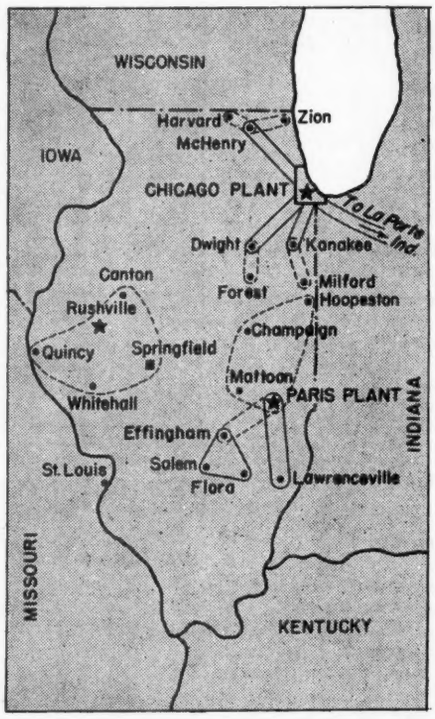
REFRIGERATED truck bodies, capable of maintaining an interior temperature of between 40 and 50 deg. F., are necessary for the delivery of pork and other sausages in prime condition without sweating or molding, according to Mickelberry's Food Products Co., Chicago. That company, which makes the famous Mickelberry pork sausage, as well known in Chicago and Illinois as Deerfoot sausage in New York and New England, distributes in Chicago and throughout the State of Illinois.

The distribution is made from three Illinois plants with a fleet of 30 trucks. The principal plant is located in Chicago, with others at Paris and Rushville. Still other plants are operated in St. Louis, Detroit, Bushnell, Ill., and Milwaukee.

Deliveries within a radius of 70 miles of Chicago are made with trucks based in Chicago. Some of these on the more remote routes, however, operate on a two-day basis, one day out and one day back. The method of two-day operation can be better visualized by reference to the accompanying delivery territory map, which also shows the relative location of the Paris and Rushville plants and the delivery area served from each.

For example, one refrigerated route truck starts out with a full load from Chicago and delivers to stores and other outlets and arrives at Dwight empty. It stays overnight in Dwight. Meantime another truck load has been shipped by motor freight and arrives at the freight line's terminal, at Dwight, by the following morning. From there the Chicago truck driver picks up his second load, goes farther out to Forest, delivering on the way. He then turns around and delivers the balance of the load on his way back to Chicago.

In this manner, by shipping the second truck load by an outside common carrier, the Chicago truck-driver salesman gets in two productive selling days without idle truck mileage.



Plants at Chicago, Rushville and Paris help to simplify the distribution problems. The looped lines from Chicago and Paris indicate the two-day overnight routes to the four pickup points.

The same procedure is followed in making deliveries to McHenry and Kankakee, Ill., and to La Porte, Ind. The dotted lines on the map from McHenry to Harvard and Zion and from Kankakee to Milford indicate the additional territory served from the McHenry and Kankakee bases.

The map also shows the relative locations of the Rushville and Paris plants with the distribution area served by each. From Paris, common carrier shipments are made to Effingham, from where route trucks cover the area to Salem and back to Effingham through Flora.

The distribution area shown is covered by the fleet of 30 trucks, of which 25 are active and 5 are spares. In the beginning, Mickelberry used ¾- to 1-ton route trucks with single rear tires. The latest purchases have been Dodge 1½- to 2-ton models with dual 7.00-20 rear tires. This change almost doubled the weight of the route load.

The latest bodies, built by the New City Body Co., Chicago, are all insulated and refrigerated by water ice. Details of the body construction and shelf arrangement are shown in the accompanying cross-section illustrations.

Insulation

Insulation is provided by spun glass in the sides, ends and roof, and cork in the body floor. The roof insulation is 5 in. thick under a canvas roof covering, painted aluminum to better reflect the heat of the sun's rays. The end and side insulation is 3 in. thick. The cork floor, covered with wood, is 4 in. thick. The interior sides and ends of the body are lined with wood. The body ceiling is of galvanized iron sheets.

Refrigeration is secured through the use of a Chill-Cold outfit made by the company of the same name in Chicago. It consists of a rectangular tank, a small centrifugal fan and an electric motor driven from the truck's storage battery. The tank is set up inside the body in the left front corner looking toward the front of the truck.

The tank has a false V-shaped bottom with a drain pipe extending down through the body floor. The V-shaped floor is perforated and is open to the air in the body. This opening is cut through the rear side of the tank proper between the false bottom and the floor of the body on which the tank stands.

The tank has a removable metal cover that is lifted to fill the tank

with cracked ice from inside the truck body. Inside the tank, extending horizontally through the middle, is a metal pipe. This pipe is fastened to the inside of one end of the tank, but at the other end extends out through the tank, where the small fan and electric motor are attached. The horizontal pipe in the tank is slit or cut at the bottom, along its entire length, inside the tank. The top and sides of the pipe are not cut.

How It Works

In operation, the refrigerating action is secured by filling the tank with cracked ice, replacing the cover and turning on the switch, which operates the tank fan and motor. This switch is inside the cab of the truck.

The suction of the fan draws air from the floor of the body through the air space at the bottom of the tank. The air carries up through the ice into the slot in the bottom of the pipe, inside the tank. The suction then draws the air through the pipe to the blades of the centrifugal fan, which expel it through the fan discharge, pointed toward the top rear of the body. This sets up the circulation of cold air throughout the body. To aid the circulation, floor racks are used to permit passage of the air under the goods carried on the racks.

The air is cooled in passing through the ice below the pipe in the tank. The ice in the tank above the pipe melts and drops to the V-shaped false bottom, and thence to the ground through the drain. The water does not get into the air pipe because the air intake is on the under side.

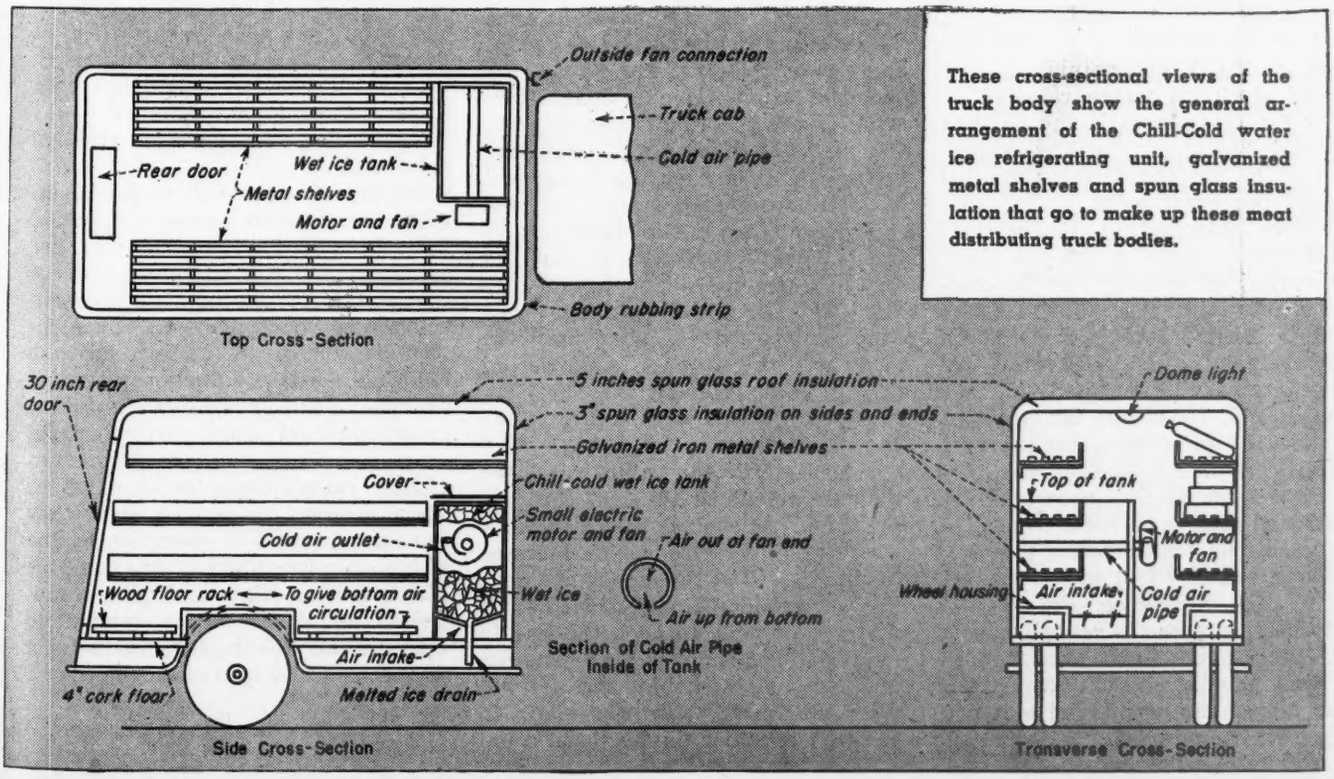
Thirty of these Dodge refrigerated trucks are used by Mickelberry's for distribution through Illinois and part of Indiana. However, only 25 of them are in active service at one time.

Reserve Supply

The ice above the pipe takes no part in the air-cooling action, but serves as an additional ice supply to cover the longest day's truck route. The outfit provides a constant interior body temperature in the range from 40 to 50 deg. F., with an average number of door openings.

Precooling can also be done without discharging the truck battery, when the engine is not running, by means of an outside plug connection below the body's left front end. At night this plug may be connected to an ordinary lighting circuit in the company garage, or at a service station, when the truck is operated on one of the two-day routes previously described.

The goods are carried in the body on six metal shelves, three on each side, with a lengthwise aisle down the middle. Access to the body is through one rear door. The body can be locked by a regular padlock hooked through the rear door handle while the driver is making deliveries.



These cross-sectional views of the truck body show the general arrangement of the Chill-Cold water ice refrigerating unit, galvanized metal shelves and spun glass insulation that go to make up these meat distributing truck bodies.

Canning Technological Advances*

In-plant chlorination for prevention of slime, spoilage of canned foods because of rough handling and contaminated cooling water, electronic sterilization of meat products and disposal of cannery wastes discussed

DURING the convention of the National Canners Association at Atlantic City technical papers were presented at the two canning problem's conferences and at the waste disposal conference, the contents of which are of vital importance to all food processors. Among the subjects covered at the conferences were: The Use of Break-Point Chlorination and Sterilized Water in Canning and Freezing Plants, Color Measurements as Objective Tests for Fruits and Vegetables for Canning, The Relationship of Spoilage to Rough Handling and Contaminated Cooling Water, Possibilities of Electronic Sterilization, Illumination Studies in Canning Plants, Cleaning Problems in Canning Plants, and Canning Factory Wastes and Methods of Disposal. Space limitations do not permit the publishing of these reports in full, however, due to their importance, we are printing them in digest form.

In-plant Chlorination

By J. E. Hall and C. C. Blundell
PictSweet Foods, Inc.

LAST SPRING experimental projects were set up for in-plant chlorination of the total water supply of a corn cannery, a pea cannery and a freezing plant for the purpose of (1) using the safest water recommended by the water industry, (2) utilizing the free chlorine residual remaining after the break-point as a sterilizing agent and (3) determining if the use of sterilized water resulted in lower bacteria counts in the finished product. The term "sterilized water" is used to designate water treated beyond the break-point.

Before chlorinating the general plant water supply at the pea plant, it was decided to determine the maximum residual of free chlorine which could be carried in the water without objectionable odors or flavors, and the effect varying residuals of chlorine would have on the product. Samples of peas were packed with water containing as high as 1,000 ppm. of free chlorine, processed and examined after a period of time. The examinations demonstrated that free chlorine had no effect on the product. With this experience, the rate of chlorination was increased beyond the break-point in all water used. It was noted that whenever water was in regular or intermittent contact with equipment, gutters and floors, no slime growth occurred. In places, missed by the spray, a slight slime formed after several days operation.

During the first five days of the survey, sterilized water was used, then the chlorinator was turned off for five days. At the end of 10 days the chlorinator was turned on again. Samples of water were tested for bacterial count morning and afternoon from (1) the Olney washer, (2) a point halfway through the hydro-geared grader, (3) the end of the hydro-geared grader, (4) the end of the flume to the blancher, (5) the blancher overflow, (6) the end of the flume to the quality grader and (7) the end of the flume from the quality grader. A count was made each time on an unprocessed can of peas. During the same period observations were made on the growth of slime.

When sterilized water was used the line remained in good sanitary condition. As soon as the chlorinator was turned off there was an increase in slime, until at the end of five days it was considered objectionable. It was not possible to keep the line in as good condition with detergents and manual scrubbing as it was when sterilized water was used. In the Olney washer the bacterial count increased 56 times, and on the blancher overflow water 67 times over that obtained when sterilized water was used. Once the chlorinator was turned on the counts dropped.

When the work was duplicated in the corn plant, bacteriological results again showed significant increases when sterilized water was not used. No product effect was found when high residuals of free chlorine were tried. At the end of the season the nightly cleanup procedure was to raise the free chlorine in the general water supply, remove coarse materials, and wash the equipment and floors down thoroughly with cold water. Where a slime growth or off-odor was noted, instructions were given to the cleanup crew to wash that particular place with cold water. No detergents were used. At the end of the season, plant and equipment were clean and there were no off-odors.

The freezing plant used sterilized water practically all season. As the operating personnel became familiar with the judicious application of water, the plant condition improved. No corrosion of equipment has been found that could be attributed to the use of water carrying free residual chlorine.

While not a cure-all in itself, in-plant chlorination seems to offer the following advantages: (1) The use of practically sterile water, and the elimination of one of the two main sources of contamination, (2) facilities in the plant to increase the chlorine dosage during clean-up periods, (3) prevention of slime growth and off-odors, particularly in those inaccessible hard-to-clean places, rather than the removal of such growth and odors once they have developed, (4) operation by the plant superintendent of the kind of plant, from a slime and odor standpoint, that he has always wanted to operate and (5) the basic value of a product packed in a clean plant.

*From Proceedings of the N. C. A. Technical Sessions at the Atlantic City Convention February 3-8, 1946.

Illumination Studies

By H. K. Wilder
N. C. A. Western Branch Laboratory

THE lighting engineer sees in the cannery the problem of properly lighting the general area of plant operation, and the many tasks that require special lighting. Each seeing task is analyzed from at least four standpoints: (1) Size of the object to be seen, (2) degree of contrast between the objects and their surroundings, (3) the time during which the object may be observed and (4) the brightness of the objects. Going further, the engineer gives consideration to glare and its effect on the eyes and on seeing, to diffusion, to shadows, to the direction, and to the color quality of the light. The seeing tasks involved in the proper inspection and sorting of various types and colors of fruits and vegetables, each having different kinds of associated material or defects, present difficult and individual problems. The necessary practice of washing the raw material before sorting and trimming introduces a problem in the elimination of specular reflection of light from the wet surfaces so that maximum visibility of defects and minimum eyestrain may be achieved. Additional data on specific seeing tasks are required.

In view of the immediate importance in the plant sanitation program of improved lighting, the committee of lighting engineers has explored the possibility of securing aid in carrying on the necessary research through the establishment of a fellowship at an engineering school. There is at Stanford University an illuminating engineering laboratory which is well equipped, widely recognized, and known to be interested in the practical application of illuminating engineering. The board of directors of the National Canners Association has approved the appropriation of funds for establishing there a fellowship for studies on lighting in the canning industry. The University has indicated its willingness to undertake the research as a cooperative project. It will be undertaken as soon as a competent fellow can be selected. As a considerable period of time must elapse before the results of this research can become available to the industry, it is the purpose of the committee to make a search for literature now available that may provide industrial sanitarians and others with information on industrial lighting practices.

Disposal of Canner Wastes

By N. H. Sanborn
N. C. A. Research Laboratory

THERE are four general types of cannery wastes: (1) Cooling tank water, (2) ensilage stack seepage, (3) gross solids and (4) factory water contaminated with organic matter. Each requires separate methods of disposal.

Cooling tank water, except under unusual conditions, contains very little organic matter, permitting direct discharge to a stream or storm sewer.

Ensilage stack seepage contains so much organic matter that it is more economical to provide separate methods of disposal when stacks are located at the factory. Stacks should be provided with a concrete base and drainage discharged to an underground collecting tank. Final disposal is by hauling it to an isolated place where dumping will not create odor nuisances, or it may be discharged at a very slow rate into a stream during the following spring, at times of high stream flow.

Gross solid materials, other than that utilized as ensilage, is obtained from discarded raw materials. For final disposal they may be given the farmer for hog or cattle feed, dumped in isolated spots or returned to fields for their fertilizer values. The Eastern Regional Research Laboratory of the U. S. Department of Agriculture is investigating the possibility of drying and utilizing cannery waste material for feed purposes.

Factory waste water, contaminated with organic material from washing, blanching and clean-up operations, is the type of waste generally referred to as cannery waste. Its successful disposal is frequently difficult. Efficient screening is essential, regardless of the type of further treatment required. Under conditions where a reduction of approximately 50 percent of the strength of screened waste is satisfactory, chemical precipitation may be utilized. Suspended and colloidal material can be removed by this method but organic material such as sugars that are in true solution cannot be removed.

Under certain circumstances, biological filtration may become necessary, but the possibilities of other methods should be fully investigated. Discharge to a municipal plant offers an excellent means of disposal where such facilities exist, or are contemplated by the city, providing suitable financial arrangements can be made between the city and the canner. In this case some form of pre-treatment, in addition to screening, is generally required before discharge to a municipal plant.

The disposal of cannery waste by means of field absorption provides the means of completely eliminating stream pollution. Since successful operation depends upon rapid soil absorption, this means of treatment is quite limited. Impounding of cannery waste in storage lagoons can be operated to eliminate pre-pollution by retaining the waste until decomposition of organic matter permits the safe discharge. As untreated lagoons develop considerable odor necessitating their location in isolated spots their use is very often restricted.

Recently a method of treatment has been developed that permits control or practical elimination of offensive odors thus permitting the wider use of lagoons. The chief obstacle consists in obtaining a site large enough to hold the waste, and yet be within practical pumping and piping distances of the cannery. A lagoon, 3 ft. deep, requires an area of 1.02 acres per 1,000,000 gal. of waste, while with a depth of 5 ft., the same volume can be contained in an 0.61 acre. To prevent obnoxious odors due to decomposition in the absence of a sufficient amount of oxygen the presence of oxygen may be maintained: (1) By natural aeration, which is limited by the solubility of oxygen in water, (2) by the dissolved oxygen content of the liquid retained in the lagoon, (3) by certain forms of biological growth and (4) by the addition of nitrate of soda, which contains oxygen in a form readily available for the aerobic organisms. To the extent that these conditions are met, odorless decomposition will be obtained.

Cleaning Problems

By C. W. Bohrer
N. C. A. Washington Research Laboratory

NO PROBLEM occupies a more prominent place in the sanitary program of a canner than adequate cleaning of food preparation machinery and equipment. A number of problems involved in the cleaning program are:

1. A thorough and complete cleanup of all equipment should be made at the end of each days' operations, and quick cleanup made when necessary during rest periods throughout the day.

2. The canner should survey his equipment with a view to cleaning needs and spoilage hazards and direct his immediate attention to working out the best methods possible, with special emphasis on those items of equipment most likely to present difficulties. When replacement is contemplated, the ease with which the new items can be cleaned should be considered along with the other desirable features.

3. After a study of the cleaning job to be done, the type of general cleaning equipment needed for rapid completion of the job, such as scrapers, brushes, nozzles, water and steam outlets, should be determined and supplied in the quantity required.

4. Since the job of cleaning is an important one, more attention should be paid to the qualifications of the worker assigned to the cleanup.

5. The purpose of detergents is to prepare the dirt or soil for its subsequent detachment by mechanical action and its final elimination by rinsing.

6. Cleaning costs money. It is desirable, therefore, that we consider what degree of cleanliness we wish to attain at any given point in the canning line so as to avoid wasting material, time and labor by continuing the cleaning process longer than is required. The object of cleanup should be to attain physical cleanliness, and in order to safeguard against spoilage, special efforts should be made to keep the number of heat-resistant spoilage organisms at a minimum. This can be accomplished by cleaning, and in the case of thermophilic organisms, by also maintaining heated equipment in a cool condition during shutdown.

Rough Handling Affects Spoilage

By Charles L. Smith
Research Department, Continental Can Company, Inc.

DURING the past few years, an increasing number of samples of spoiled can goods are being reported as not clear cut as to the cause for leakage. The relationship of this increase to rough handling of filled cans, coupled with the possibility of contaminated cooling water was investigated, both in the laboratory and in the field. Obviously, if the can shows no defects in assembly or in manufacture, the only possible entry point for leakage bacteria is through an apparently satisfactory double seam. Substitute materials used in the double-seam compounds cannot be blamed as the probable explanation for this type of can failure. Yet, if the seam was well formed and the double-seam compound was good, why then should there be any failure of the can through the double seam? The answer is rough handling or denting of the cans particularly when they are wet with bacteria-laden cooling water.

If any break occurs in the continuity of the seal, as from a dent, spoilage is possible. Whether or not leakage will result depends upon three main factors: (1) The position of the dent, (2) the force and direction of the deforming blow and (3) the ever-present question of whether the double seam compound has been sufficiently disturbed at the point to permit microorganisms to gain entry into the can.

The medium surrounding the can at the time of a critical dent has a tremendous influence on the probability of spoilage resulting from leakage. This is apparent from the relative levels of contamination of air and water, particularly cooling canal water. Heavily contaminated air has a relatively low bacteria count—somewhere in the neighborhood of two organisms in 10 cc. On the other hand, counts of from 100 to 100,000 bacteria per cc. are not uncommon in cooling canal water. Thus, a given dent permitting the entrance of even minute amounts of cooling water could be very hazardous, whereas the same dent, admitting the same amount of air, would be considerably less likely to result in spoilage.

In order to determine the protection efficiency of double seam compounds in the laboratory, a standard biological test, better known as the Bio Test, is run. The test consists of placing about 1 oz. of dried peas in a 307 x 409 can, filling the can with a weak sugar solution at or above 200 deg. F., closing with covers bearing the test compound or control compound. The closed cans are then sterilized at 240 deg. F., in a standard retort. While the cans are being sterilized, cooling water is inoculated with heavily laden bacterial cultures. The organism used is one which is a rapid producer of gas in the medium prepared in the can. The concentration of these bacteria in the cooling water is about 4,000,000 per cc. High vacuums (about 16 to 19 in.) at the end of the cooling period, assist the bacteria to find their way to the inside of the can in the event of a break in the seal.

After a standard period of cooling in the contaminated water, the crates of cans are removed, tilted to drain off the excess water, and the wet cans are then run down an abuse hazard. The cans roll down one length of track, strike a metal stop, drop to the next lower track and so on. During this treatment, the cans, especially the groove between the lower edge of the double seam and the can body, are wet with water carrying a high concentration of bacteria. Cans are examined daily, and all swells are removed from the regular spoilage examination routine. Only swells that show no obvious reason for leakage other than dents are counted as failures of the double-seam compound.

For a commercial test, a compound found to be unsatisfactory in the Bio Test, was purposely selected. It was selected because it gave the highest spoilage rate of any tested during several years, 200 cans per thousand. Half of the cans were run in the usual manner; the remainder were allowed to dry overnight after water-cooling in the inoculated cooling water before they were sent down the abuse hazard.

Those cans run down the hazard when wet showed the same high spoilage rate of 200 cans per thousand. Those allowed to dry before traveling the abuse hazard showed the low spoilage rate of four cans per thousand. Several repetitions of this test, as well as similar tests that have been run in the laboratory since, have produced the same type of result.

One of the most significant observation on an entire season's pack was made in one factory where peas, whole kernel corn, and creamed-style corn were packed in No. 2 cans. Some 12-oz. vacuum packed corn was also run. In peas, spoilage average amounted to seven cans per thousand. All cans were handled over automatic equipment. Whole kernel corn was also handled over this equipment and the spoilage rate on at least 30,000 cases ran over 16 cans per thousand. The creamed-style corn was hand cased. These were identically the same cans as used for the whole kernel corn, but the spoilage from all causes was less than one can per thousand. The 12-oz. vacuum packed corn was hand cased with a gross spoilage result of less than .75 cans per thousand. The condition of the cooling water was not known. There were, no doubt, factors other than automatic handling equipment and cooling canal water to contribute to the high level of gross spoilage, but the results seem to indicate that these factors have a definite bearing upon spoilage of canned goods.

In reviewing the points covered the following facts are evident: (1) Spoilage, in general, was increased where automatic filled-can handling systems have replaced hand casing directly from crates, (2) rough handling of cans is especially dangerous when the cans are wet with highly contaminated cooling water, (3) many installations of automatic filled-can handling equipment are improperly adapted for the purpose intended, (4) many automatic filled-can handling units are not properly adjusted to minimize can abuse, (5) automatic filled-can handling equipment is and has been essential to the production of canned food and as such will continue to be used and (6) every attempt should be made by all concerned to minimize the spoilage through proper adjustment of seams, eliminate all possibilities of can abuse from automatic lines and, where advisable, control the bacterial count of cooling water by chlorination.

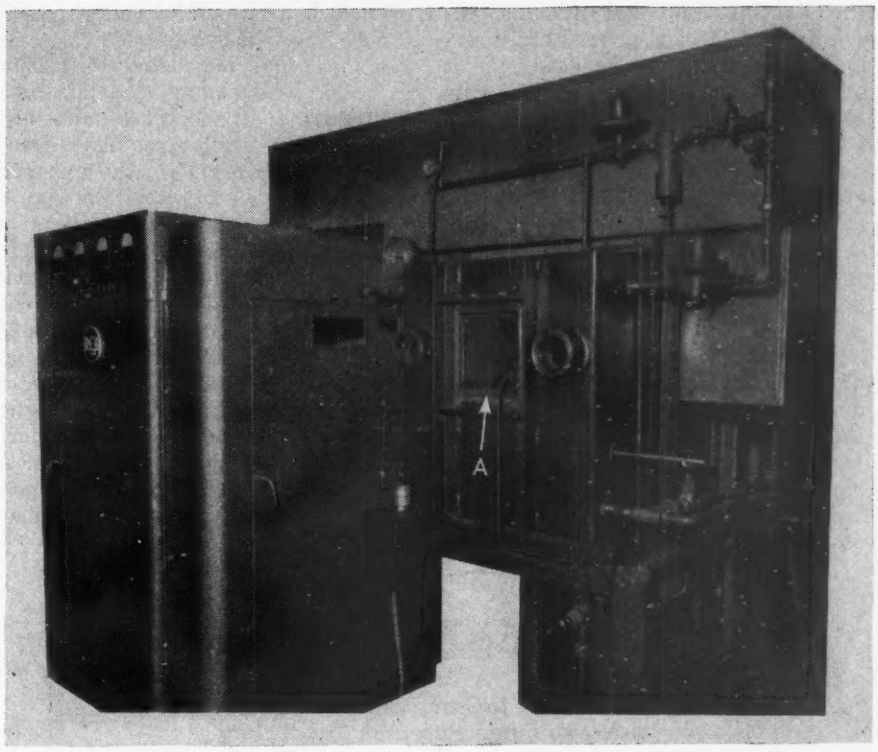


FIG. 1. Radio Frequency Generator and Applicator. The applicator plates, between which the food containers were placed, are located in a pressure chamber (A). An adjustable support permitted lowering the container into a tank of water for further heating or cooling. Desired water temperatures were obtained by a heat exchanger.

Electronic Sterilization

By H. A. Benjamin and O. F. Ecklund
Research Department, American Can Company

THE basic advantage of electronic heating is that large masses of dielectric material can be rapidly and uniformly heated. If successfully applied to food sterilization it might reduce from hours to minutes the time necessary to sterilize certain products, and result in improved quality. Due to the added cost of this method, as compared to conventional methods of heating, meat products where improved quality might offset this increase, were selected for an investigation. A 15-kw. output, 10-megacycle radio frequency generator was used, with an applicator unit consisting of two plates between which the food container was placed for heating. Plates were located in a copper-lined steel pressure chamber in which pressures of 45 lb. per sq. in. could be maintained to prevent undue strain on containers when temperatures of 250 deg. F. were used. (Fig. 1.)

In a series of tests, samples were prepared by heating in a container made from a 90 mm. Pyrex tube fitted with metal ends. The ends acted as electrodes and were in actual contact with the food to be heated. Heating time varied from 0.5 to 5.0 min. After heating, the container was lowered into water at a temperature of 250 to 255 deg. F. to sterilize the walls of the container. The container was then cooled.

Although radio frequency energy was used in most tests, a few were conducted using ordinary 110-volt 60-cycle current. Since the product was heated almost as rapidly by 60-cycle current, heating must have been largely by resistance. Some improvement in flavor and texture was noted in the luncheon meats and Vienna sausage. The numerous limitations, however, of electronic heating in the double-end containers tends to make the method impractical.

Among the difficulties encountered were local heating, arcing and burning, which resulted from poor contact between the metal ends and the product being heated. The slower

the heating, the less trouble encountered in this respect. Local overheating resulted in the development of high pressure, which usually forced the end from the container. Fairly uniform heating of homogenous products was obtained. Heating of non-homogenous products, such as meat containing layers of fat were far from uniform. In one test, where fresh ham was being heated, a temperature of 260 deg. F. was indicated by one thermometer, while another a little over an inch away indicated a temperature of only 190 deg. F. Upon examination some of the fat was found to be scorched while part of the lean meat was still raw.

From tests made to determine whether the available high frequency field had any effect on the viability of spore-forming bacteria when heat was not permitted to become a factor, it is evident that there was no reduction in the spore count as a result of the radio frequency treatment. It appears that the exposure may even have activated the spores.

Although a method of radio frequency processing may be developed, the application will be a difficult one. The arching that caused so much difficulty at 10 megacycles possibly could be reduced by the use of higher frequency fields. It is probable that frequencies in this or a higher range will result in more uniform heating of homogenous products. At the present time, however, high power ultra-high frequency equipment is not available.

Processing Tomato Juice

By E. J. Cameron, Director
Washington Research Laboratory

As significant variations in the preparation and processing of tomato juice have been introduced in recent years, it seemed advisable during the past year to prepare a summary of methods. Five methods are discussed: (1) Pasteurization by continuous heat exchangers to temperatures substantially above the boiling point. Cans are filled at not less than 195 deg. F. and inverted to sterilize the covers. After a one-minute hold cans are cooled in water; (2) in plants not equipped to presterilize tomato juice, the product is hot-filled, given a holding period in air, and then water-cooled. The juice should be heated enough to obtain a closing temperature of 200 to 205 deg. F., and the cans held inverted for a time sufficient to complete sterilization of the juice and can before cooling; (3) in plants using air-cooling following hot-filling, it is suggested that No. 2½ and smaller cans be closed at not less than 195 deg. F., and that larger can sizes be closed at 190 deg. F. Care should be taken to see that the cans are inverted after closing and stacked to allow air circulation between cans; (4) when processing in boiling water, time and temperature are varied with the size of cans used and (5) processing in cookers designed for revolving the cans or spinning them rapidly about their axis, while in a water bath or spray at temperatures near boiling. Substantially lower temperatures are required in this type of cooking than for the steam retort-type cooker. Temperatures required are dependent on a number of factors such as headspace and rate of rotation.

Color Measurements

By A. Kramer, University of Maryland, and
H. R. Smith, N. C. A. Research Laboratory

IN laboratory work on the development of objective tests for canned foods, we have been investigating methods for measuring the color of prepared foods.

The instruments used in this study fall into the general categories that may be classified as (1) psychophysical, instruments that give a numerical value of the color as seen by the eye of the observer, and (2) physical, actual physical measurements in terms of wave lengths and percent transmittance at a given wave length.

The Keuffel and Esser Disc Colorimeter is an example of a psychophysical instrument. The eyepiece through which observations are made shows a field divided into two semicircles. The object whose color is to be measured is seen in one of the semicircles, while the color against which the sample is to be compared is projected to the other semicircle from a disc. The color on this disk may be adjusted or changed by covering its surface with various cards of definite specifications.

The following procedure was used to establish a color test when the disk colorimeter was employed: (1) The three or four color cards of a known Munsell notation were selected, which when combined matched the color of the product; (2) several samples selected for their wide variation in color were tested in order to check on the range available with the particular color cards, and (3) a large number of samples was carefully prepared so that duplicate cans would be as much alike as possible.

In the physical method, color is extracted from the product to be tested by one or more solvents. The colored solution is measured in a spectrophotometer in terms of transmission of light at a specific wave length.

In establishing the spectrophotometric test, the procedure used was: (1) A suitable solvent or combination of solvents was selected for extracting the desired pigment; (2) the dissolved pigment was examined for turbidity since turbidity interferes with transmittance measurements; (3) the transmittance curve was plotted against wave length for extracts of several samples varying widely in color, and (4) a large number of samples were carefully prepared so that duplicate cans would be as much alike as possible.

Each method has its advantages and limitations. In the preparation of the sample the great advantage lies with the disc colorimeter, in that the sample is measured practically as it is removed from the container.

The spectrophotometric method, least influenced by the human element, does not require special training, can be obtained by color blind individuals, and is less cumbersome. It is much easier to keep the cuvettes of the photometer clean than to keep thumb prints and dust particles from the color cards. Tentative methods have been developed for the following commodities: Disc colorimeter method—Beans, green and white; beans, lima; beets; carrots; tomatoes. Spectrophotometric method—Apricots; beans, green and wax; beans, lima; beets; carrots; corn; peaches; tomatoe..

Peanut butter in a new form, in a different package, and with added flavors.

Peanut Butter Improved By Changing Flavor and Texture

By the addition of sugars and hydrogenated oils, the texture of peanut butter was improved. Good flavor combinations were developed, separation of oil was prevented, stickiness reduced and spreadability improved

By J. G. WOODROOF, HELEN H. THOMPSON and S. R. CECIL
Georgia Agricultural Experiment Station, Experiment, Ga.*

IN studying means of improving peanut butter five objectives have been sought: (1) To prevent the separation of oil, (2) to develop types that can be molded into blocks and marketed in rectangular packages, (3) to improve the consistency so as to have practically no stickiness while being sliced, handled, or eaten, (4) to determine what flavors are compatible with peanut butter, and suggest formulas for the commercial manufacture of various flavors and (5) to develop peanut butter with improved spreadability.

In the course of this study, most of the brands of peanut butter commonly occurring on the market in this country were evaluated, and more than 100 modified peanut butters were made. About 24 kinds of cellophane, pliofilm parchment, foil, and other wrapping materials for packaging were studied.

Changing the Flavor

The first flavoring material to be added to peanut butter is salt, which is universally accepted and desired. It is apparent that there are others that may become just as acceptable and desirable. Throughout the remainder of this discussion it will be assumed that salt has been added. The normal flavor of fresh peanut butter has a very wide acceptance, and to fully half of the consumers it is not improved by the addition of other flavors. To these consumers, added flavors are artificial and are in demand only as novelties. Among other consumers there is a constant desire to make it taste differently, to serve it in a different manner, and to subdue or modify the peanut flavor.

Peanut butter has a very characteristic and pronounced flavor. In order to modify it, strong flavors or large quantities of mild flavors are required.

In Table I are listed, in order of preference, approximately 40 flavoring materials that were tried. Fourteen were listed as being "very good" because they either added a different flavor, as chocolate, malt, fruit, or olive; or accentuated the peanut flavor, as pickles, cloves, vanilla or spices. In most cases, a flavored peanut butter should receive a limited quantity of several flavors. For example, a small amount of vanilla improves most peanut butter to which sugar is added; and onion salt or spices improves most peanut butter to which non-sweet flavors are added. The materials listed as "promising" or "poor" were considered so for a variety of reasons. Sliced dill pickles, sweet pickles, or olives are well liked when added to a peanut butter sandwich, but when ground they are objectionably dark, sticky, and gummy; pimentos freshly mixed into peanut butter are very good but on standing they develop an oxidized flavor and dark color; coarsely chopped raisins in peanut butter are very good, but when finely ground they are unattractive and the flavor apparently changed. Various types of preserves, jellies, and sirups are ordinarily good when freshly mixed with peanut butter, but when thoroughly mixed with it and held for a few days the mass

*From Bulletin No. 243. Georgia Experiment Station. "Improving the Quality of Peanut Butter." All references were omitted.

TABLE I—Materials Used for Flavoring Peanut Butter, Grouped According to Desirability.

Flavoring material	Approx. quantity req'd.
Very good	**Percent**
Orange oil	trace*
Grated lemon peel	2*
Grated orange peel	2*
Chocolate	2-3*
Sweet pickles—chopped	30
Olives—chopped	30
Candied or glazed fruits—chopped	30
Raisins—chopped	20
Dates, prunes, or dried figs—tenderized	20
Malted milk	20
Sweet pickles—chopped and partly dried	20
Olives—chopped and partly dried	20
Jam, preserves, or marmalade	40
Cloves, vanilla, spices, or onion salt	trace*
Promising	
Pimento—roasted and chopped	40
Maraschino cherries—chopped	20
Fruit jelly	40
Honey	20
Chili sauce	25
Chili powder	1
Candy gum drops or similar candy	25
Sweet potato—baked pureed	40
Poor	
Peaches or apples—dried, chopped	25
Yeast	20
Celery seed or mustard	trace*
Dill pickles—chopped	20
Evaporated milk	30
Dry skim milk	15
Sugar cane sirup	30
Prepared cereals or toast	20
Synthetic fruit flavors	trace*

*Used to enhance the flavor of sweetened or already partially flavored products. The addition of 20 percent sucrose or 25 percent dextrose to peanut butter makes an excellent "sweet base" with which to incorporate most of these flavors.

becomes gummy, sticky, and unattractive in appearance and taste.

Evaluation of the 40 materials listed is useful to those who would like to make combinations for a specific purpose. One manufacturer might desire a sweet, firm, peanut butter for sandwiches made on a production line, another might want a sour or tart flavored peanut butter sandwich as a meat substitute, and another might like to market peanut butter of various flavors with spreading properties. At any rate the possibilities of increasing the utilization of peanut butter by modifying the flavor are considerable.

Preventing Oil Separation

There is a normal tendency for free oil to rise to the surface of peanut butter on standing for a few weeks at room temperature. Separation occurs, at normal temperature, for about one year. Where no provisions are made to prevent separation, a large amount of free oil on the surface may indicate old peanut butter or that it has been stored at a high temperature. A fresh product will have very little or no oil separation.

There are several means of preventing the separation of oil in peanut butter. The surest and most desirable, from the standpoint of quality, is to keep it cooled to 50 deg. F. or lower. At this temperature the oil is very viscous and does not separate, the development of rancidity is greatly reduced, and insect infestation is practically eliminated. The second and most practical means is by adding from one to three percent of hard fat or hydrogenated oil as the peanuts are ground into butter. This renders the oil too viscous for separation, increases the total oil content of the product, and slightly dilutes the flavor. Hydrogenated soybean oil was found to be very satisfactory, but refined peanut oil, cottonseed oil, or other vegetable oils probably would serve just as well, as the important thing is the amount of hydrogenation. Theoretically, the oil already present can be hydrogenated, but it would be simpler to press out a part of the oil, hydrogenate it, and add it to the peanut butter as mentioned above. Since hydrogenation requires strictly controlled conditions, the peanut butter manufacturer may prefer to buy and add hydrogenated oil. It is recommended, however, that wherever possible, means other than hydrogenation be used to prevent oil separation since hydrogenated oil tends to dilute the flavor.

A third means of retarding oil separation is the addition of a product to absorb the oil, such as ground, raw peanuts, sucrose, dextrose, dried milk, raisins, oat flour, defatted soy flour, starch, or malted milk, in the quantities indicated in Table II. These materials slightly dilute the flavor but add other flavors.

A practice that will greatly reduce the amount of oil on the surface of peanut butter is to store the jars in the warehouses, in the inverted position. When they are placed upright on the retailer's shelf, there

(*Turn to page* 218)

TABLE II—Materials Combined with Peanut Butter to Improve the Properties for Slicing.

Material	Amount Percent	Quality of product after 4 weeks at 90°F. Oily surface*	Grams Firmness**	Desirable flavor*	Desirable aroma*	Ease of slicing*
Dextrose	20					
Powdered sugar	5	10	338	8	7	9
Dextrose	25	10	315	8	7	9
Dextrose	15					
Powdered sugar	10	10	337	7	7	9
Hydrogenated oil	3	10	240	7	7	10
Dextrose	10					
Powdered sugar	15	10	267	7	7	8
Malted milk	20	9	177	9	9	8
Raisins	20	8	297	9	9	4
Soy flour	15	9	286	3	5	8
Dried milk	15	9	193	5	5	8
Powdered sugar	20	9	155	6	7	8
Oat flour	10	6	121	6	6	5
Glycerine	1	8	118	6	9	4
None	..	2	115	7	10	1

*Numbers represent quality, 10 most satisfactory.
**Grams required to penetrate ½ in. with plunger 5/32 in. in diameter.

TABLE III—Condition of Molded and Flavored Peanut Butter After 28 Days Storage at 100 Deg. F.

Formula No.	Attractive appearance*	Oily surface*	Desirable aroma*	Desirable flavor*	Desirable texture*	Percent free acid as oleic**	Peroxide number milli-mol per kg.**
1—Orange	9	9	9	10	10	.32	6.4
2—Chocolate	9	9	7	8	9	.33	8.4
3—Raisin	8	10	9	10	7	.41	4.9
4—Malt	9	9	7	7	9	.43	11.4
5—Sweet Pickle	6	10	5	4	8	.45	7.8
6—Chili	10	10	7	8	9	.77	7.3
7—Hydrogenated oil.	9	8	6	6	9	.38	12.8
8—Control	7	2	7	6	6	.26	11.7

*Numbers represent quality: 10 most satisfactory.
**The authors consider 0.5 to 1.0 percent free acid or a peroxide number of 10 to 15 milli-mols as the beginning of definite chemical rancidity.

TABLE IV—Materials Combined with Peanut Butter to Improve Spreading Properties, Listed According to Desirability.

Material	Percent	Quality of product after standing overnight at 36 deg.F. Oily surface*	Desirable flavor*	Desirable aroma*	Ease of spreading*
Chocolate sirup	50	10	9	10	9
Fruit jelly	50	10	8	10	9
Jam or crushed preserves	50	10	9	10	8
Honey	50	10	9	10	8
Sugar sirup 65 percent	50	10	7**	9	9
Corn sirup	50	10	8**	10	6
Whole milk	45	9	3**	5	10
Evaporated milk	50	9	4**	6	9
Water	39	10	3**	4	10
Glycerine	1				
Water	39	10	3**	4	10
Lecithin	1				
Sweet potato puree	50	8	5**	7	6
None	..	7	7	10	6

*Numbers represent quality: 10 most satisfactory.
**May be flavored as desired with materials shown in Table I.

Pak-C-Lector Packs Rapidly

This machine cuts, weighs and fills, continuously and automatically, tuna or other products without fitting or breaking. No portion is made unfit for first quality pack

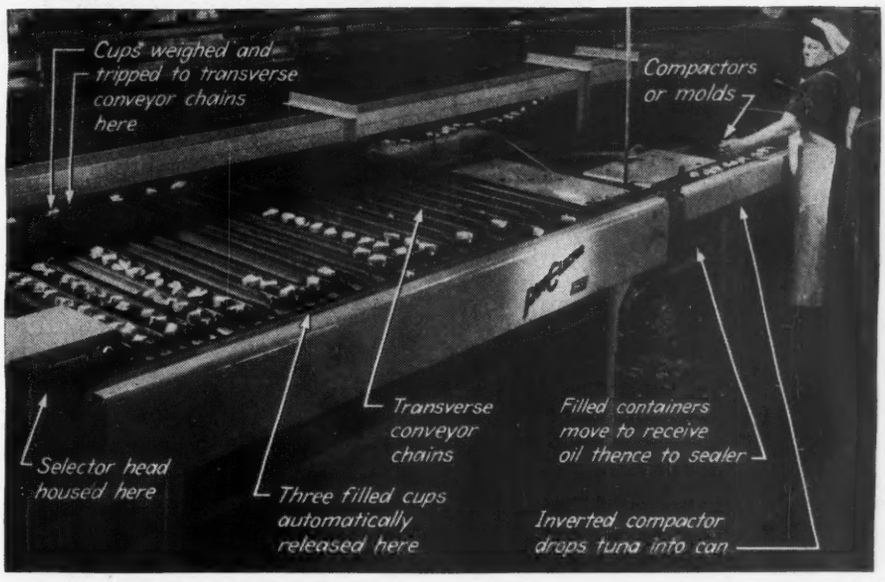

Cups weighed and tripped to transverse conveyor chains here
Compactors or molds
Transverse conveyor chains
Filled containers move to receive oil thence to sealer
Selector head housed here
Three filled cups automatically released here
Inverted compactor drops tuna into can

FIG. 1. The Pak-C-Lector. Transverse conveyors hold varying weights of tuna in cups. Inclosed selector head, at left. Cups travel toward operator who picks up groups of three and places tuna in mold compactor.

THE Pak-C-Lector, manufactured by Eben H. Carruthers, Astoria, Ore., provides a mechanical means for filling containers to correct weight with several pieces of tuna fish (or other products) without the need for fitting or breaking. It does not make a portion of the fish unfit for first grade pack.

Tuna loins are mechanically sliced in lengths the height of a can and and these pieces drop into small aluminum cups which travel on a conveyor to the Pak-C-Lector. The conveyor carries the filled cups into a channel where they are moved over scales by pusher arms. Scales are set with approximately 3½ grams variance. When a filled cup passes over it its weight trips the scale and automatically moves the cup onto a transverse conveyor chain on the selector table (Fig. 1). The heaviest cups are diverted at the first part of the machine—lightest at end—and those containing pieces too light for the machine to handle are returned to the filling station.

Selector head (Fig. 2) controls the releasing of groups of three cups from the transverse channels by operating individual triggers at the end of each channel. The mechanism is responsive only to the availability of complete combinations (three cups) that will make up the exact desired weight of one can of tuna.

The machine is set to release a maximum of 30 groups of cups per minute, but due to intervals when the selector head is reaching for correct weight combinations, the average rate is around 25 groups. Two women operators can fill 25 cans of tuna per minute on the machine whereas women, filling by hand, average only 2 to 3 cans per minute.

FIG. 3. Compactor molds are attached to conveyor; they mold the three pieces of tuna to can size. On the return (underside) side of conveyor a plunger pushes tuna out of mold into cans.

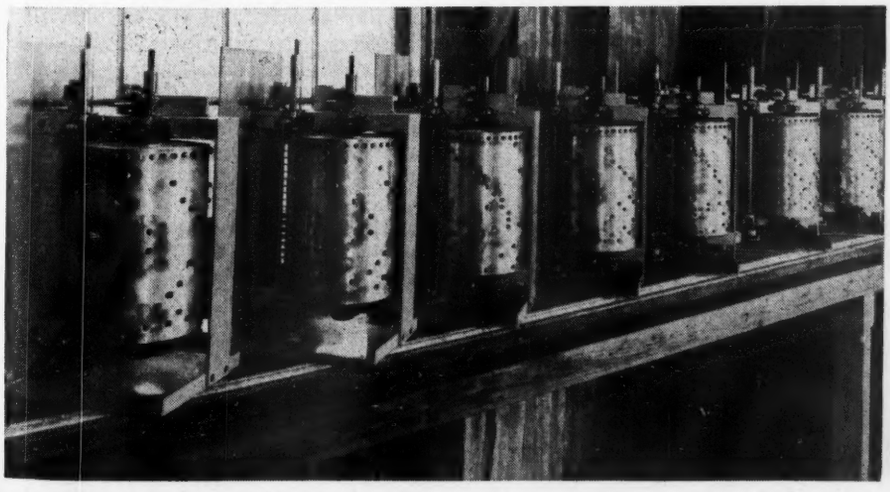


FIG. 2. Selector heads have fingers arranged to select groups of three cups, which make up the weight of a can of tuna.

Groups of three cups, released by the selector, move to the filling station where an operator takes the chunks of tuna from the first group (then each consecutive group) and places them in the compactor mold (Fig. 3). The pieces of tuna are molded into a shape somewhat smaller than a can and, on the underside (return) of the conveyor a plunger pushes the tuna from the mold into a can. Movement of cans on conveyor are correlated to delivery of tuna by plunger from molds.

Where Do We Go From Here With Frozen Foods*

With the years of early development safely past, the industry must safeguard itself against the opportunist and the incompetent. From now on, quality will be the measure of difference between profit and bankruptcy

By EDWIN T. GIBSON, Vice-President, General Foods Corp., New York

THE frozen foods industry has a few urgent problems to face before there can be any answer to the question, "where do we go from here?" And the crux of those problems rests with the fellow who puts the whole $100,000,000 a year industry in jeopardy by marketing quick frozen foods that the housewife finds to be inferior in quality. Just as one bad apple may spoil a whole barrel of apples, so one opportunist or one incompetent may not only bankrupt himself, but he will grievously hurt the whole show for the rest of us.

Quality, waste-saving convenience, and garden-fresh flavor have been the great secrets in the popularity of frozen foods to date. They have been open secrets, but not universally cherished! For once a man recklessly starts to trifle with quality he gets a bad name, not only for himself—that's bad enough—but he gives the whole industry a bad name.

The opportunist may intrigue a housewife into buying his product once, but if it does not stand up to his printed promises, she'll drop it like a hot potato, and he'll be a cold potato from there on.

You know all this is true. It was true, even in wartime, when shortages forced the consumer to accept whatever the grocer's gaping shelves had to offer, but it will be infinitely more apparent in this intensely competitive postwar market, now and in the days ahead.

Let's see it clearly! We are in a quality market. The American public, with its larger purchasing power, became increasingly quality-conscious during the war. We saw it in foods. The public to a large degree ate more food and better food than ever before.

The American people have come to learn that quality is the best buy. That situation will continue as long as American business and industry provide a high national income. Consequently, the shrewd frozen food producer from now on will be the man who builds for the long-haul by establishing a reputation for quality items, by doggedly keeping up that quality and improving upon it.

What happened in other industries? Go back to the early days of the motorcar. A great new industry. Remember all those shadowy names of cars of bygone days? Where are most of them today? The opportunist, the "quickie," tried to cash in on the sudden new popularity of motor travel. His mind was on selling cars, not on building quality into his rattletraps. So he's forgotten, along with his car. It happened in the radio industry, more recently.

It surely will be true of television and of private airplane production. Let us not let it happen to our frozen food industry, now climbing so fast in popular esteem.

Whether some of us realize it or not, this may be our only chance and our last chance to put our house in order and enforce quality control. Such is the growing popular interest in these new foods that, if some are lax, or cynical, or indifferent, we'll all wake up some day to find outsiders enforcing quality control, much to our chagrin and discomfort.

There are only two ways to make quality control effective. Either industry polices itself, or it suffers additional governmental supervision. If shoddy goods provoke the public into voicing its disappointment, government agencies will prick up their ears, and then you'll have restrictive laws. You will have new bureaus in local, state, or national govern-

Delicate flavor and texture must be prime concerns with the frozen food processor. These peas are about to go through a quality separator that chooses only the sweet and tender ones.

*Condensed from a talk given before the National Frozen Foods Packers Association, Atlantic City, February 6.

ments and needless interferences in your operations.

Internally or externally quality control is inevitable. Which do you choose? Which makes for greater efficiency? Which is more profitable and likely to assure long-range security of operations? Which will keep us free to earn, and merit, public confidence and support? The answer is up to us.

It is our job, individually as manufacturers, and collectively as founding members of a progressive new industry, to push quality control to the highest point of efficiency in our own organizations, and help others to see the profitable wisdom of it.

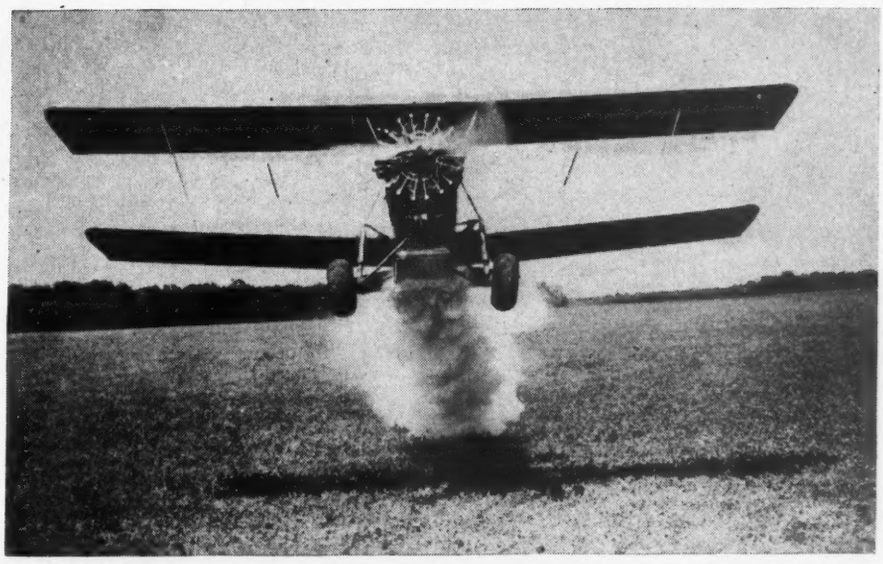
We found out, fast, when we entered the quick-frozen food business 16 years ago, that quality control is utterly essential. Clarence Birdseye and his group had done much in developing proper freezing techniques, but there was much more to be done.

We had to overcome the prejudices of housewives against these new foods. We had to wrestle with the headaches of distribution. There were no railroad cars capable of holding low temperatures, no trucks that could transport these foods and hold them at the temperature required. There were also insufficient low-temperature facilities in the warehouses, not to mention the fact that retail stores had no facilities for properly keeping or displaying our products.

But it went back further than that. Freezing does not put any quality into raw foods that lack quality to begin with. And so, very quickly we learned that we would have to undertake a costly program of horticultural soil and crop research. We had to examine thousands of strains of fruits and vegetables, acreage yields in future growing areas, and weather records for those areas. In peas, we had to study 105 strains alone.

We found, for example, that U. S. agricultural practice was to grow foods that could take a beating, enduring shipment to distant markets, and stand up a long time until eventually they reached the home kitchen. That wouldn't do for us. Since we concentrated upon cleaning, processing, packaging and quick freezing on the day the raw foods were harvested, we were far more interested in foods of delicate flavor and texture than were others.

So, we had to work with farmers, fruit growers, agricultural experts and colleges. We had to stimulate the growing of new quality strains developed especially for quick freezing.



A costly program of soil and crop research met the altered quality requirements for frozen foods. Here small pea vines, destined for Birds Eye, are being dusted to effect pest control.

It did not stop there. We discovered that frozen foods may be harmfully affected by desiccation and oxidation. So, we went to work on new packaging materials and new technics, testing them under actual conditions and in our laboratories, until we found those assuring top quality. It became necessary to enforce the greatest sanitary conditions in the plants, a rigid supervision all along the line.

Know Your Job

These are among the many reasons why the packer must recognize the fact that there is more than just freezing to the frozen food business. He must know the scientific principles both of processing and freezing. Otherwise, a poor or bad product may result. And, when poor products creep into the grocery stores, they give the rest of us a black eye. In fact, if I sound a trifle plaintive, it may be because that during the war more than one housewife gave us, or her grocer, a red-hot going over, when a frozen package proved faulty, and when we scrutinized the case, we found that it was not a Birds Eye package at all.

Broadly speaking, the industry must be encouraged by government and consumers to grow and prosper. More and more quality raw materials must be grown by our farmers. The philosophy and wisdom of balanced nutrition must penetrate millions of homes.

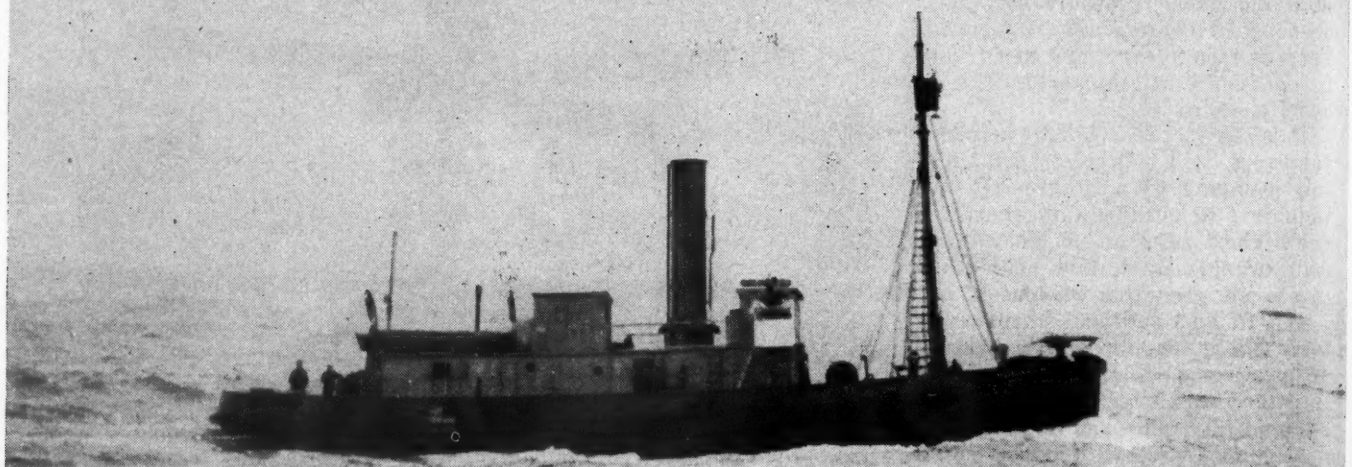
Already the trend is in our favor. Just a day or two ago, the papers reported that the demand for frozen foods is two years ahead of the supply. They estimated that these foods "eventually will represent 35 percent of the retail food trade and gross $6,000,000,000 annually—compared with $100,000,000 today.

Already nearly one-tenth of the retail outlets are selling frozen foods, and 50,000 more are looking for facilities to do so. There are 450 commercial freezing firms now. In 1945, they packed nearly 70 foods —fish, fruits, vegetables, meats and berries, a total of 600,000,000 lb. In three years there may be 2,000 packers.

Further, a survey revealed that more than eight in ten housewives, in cities over 100,000 population, buy frozen foods, with one-third of them buying these new foods regularly. Cornell University reports that nine women in ten questioned, declared that they would buy more of these products if they had storage room.

Finally, I want to say how happy we Birds Eye people are to see the distributors and packers organizing for greater efficiency, and for mutual cooperation in self-betterment. Each of us, individually, can be expected to do his share. I believe that every man wants to do the right thing, only sometimes he doesn't trouble to learn how to do the job right, and sometimes, he thoughtlessly tries to cut too sharp a corner. So let's appeal to these fellows' pride. For pride is a strong factor in the food industry. Each of us is proud of our good name. We mean to protect that good name. And quality control, I submit, is just about the best insurance for that. It really works.

Australia Is Going Fishing



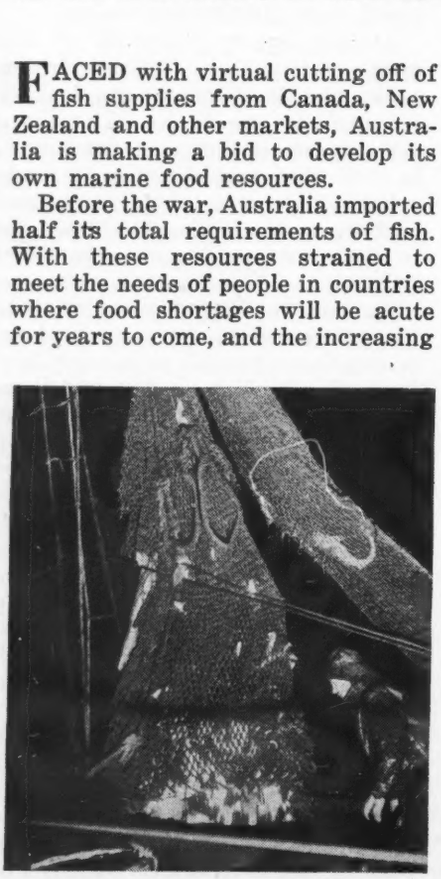
As part of its fishery expansion program, Australia is looking to the Antarctic, where Germany and Japan captured 23 percent of the whales taken in 1938-39. Outfitting ships, such as the one shown here, with its harpoon gun mounted, cannot be undertaken at present.

Expansion of what is now a "backward" industry is getting serious attention from a government that is concerned by the cutoff in fish supplies from Canada and New Zealand

By A. MAKAROFF, Sydney, Australia

FACED with virtual cutting off of fish supplies from Canada, New Zealand and other markets, Australia is making a bid to develop its own marine food resources.

Before the war, Australia imported half its total requirements of fish. With these resources strained to meet the needs of people in countries where food shortages will be acute for years to come, and the increasing demands for marine foods, Australia is planning intensive development in several directions.



There are fewer than 4,200 full time fishermen in Australia, but plans are underway to expand the trawling industry to the large northwest plateau and to the Great Australian Bight. This trawl-full is being emptied on the deck of a British trawler, but in the North Sea, far from Australia.

A committee of representative fishermen recently declared the industry to be in a "backward state." The New South Wales government subsequently adopted the committee's recommendation, including encouragement to fishermen to form cooperatives in order to establish fish depots and a central distributing organization. Pending cooperative marketing by the fishermen, the N. S. W. government has taken over marketing of fish in Sydney.

Aerial Spotting

One profitable method of increasing the industry's output is to use aerial spotting for fish. This method is already out of the experimental stage in Australia, and authorities declare it will save costly and time-absorbing searches.

Japanese trawlers were active in the north, west and southwest of Australia before the war, and their withdrawal leaves large areas to be exploited by local fishermen. To get the industry started, Council for Scientific and Industrial Research, Fisheries Division, has proposed five directions for expansion:

The Directions

1. Development of a national whaling industry, based on winter (coastal) and summer (Antarctic) fishing. Aerial reconnaissance has produced valuable new information on migration movements of whales, but whaling requires large capital resources and is hedged about with problems of international treaties and agreements as well as marketing.
2. Extension of the trawling industry to the large submarine plateau lying northwest of Australia, to Tasmanian regions and to the Great Australian Bight. The Japanese trawler, Shinkyo Maru, apparently took payable quantities of bream, snapper, perch and other fish from the Bight in 1936.
3. Further development of oyster and crayfish industries.
4. Development of the pelagic fish-

(*Turn to page* 214)

EDITORIALS

LAURENCE V. BURTON, Editor

Famine Emergency Committee

APPOINTMENT of Herbert Hoover to head the Famine Emergency Committee means that one of America's most capable executives will direct the redistribution of the world's dwindling food supplies. It is hoped that this will not be a vain effort to salvage the lives of millions.

During the past 28 years, Mr. Hoover has exhibited a knowledge of the world food situation so profound that it is doubtful if anyone could be better informed. Like Mr. Churchill, when he took over the direction of Britain's war effort, Mr. Hoover could have said, "I told you so." Yet, like Mr. Churchill, he refrained from the obvious.

The primary purpose of The Famine Emergency Committee will be to "sell" to the American people the ideal of reducing our consumption of foods that can be immediately shipped overseas.

There is little that processors can accomplish now other than help to conserve what we have left over from the 1945 crop year. Hence Mr. Truman's "39 Ways for Saving Food." What can be done must be done—*now*. In 1946, America must do its utmost to replenish our food reserves. The job is primarily one of self-denial plus another superhuman effort by the farmers of this continent. Processors of cereals will, unhappily, be called upon to adapt themselves to reduced supplies and to use substitutes where they are available. The tasks will not be easy, but the objective is worth an all-out effort.

"Goos" Have No Terror Now

DURING a recent visit to the research department of a big chemical company, we were impressed by an important change of attitude of chemists. Time was when any chemist in his right mind would avoid, wherever possible, any work in the field of goos or gooey messes. Today, however, work in the field of synthetic plastics is taken in stride, and messes that were once the despair of all but the most patient are no more bother than research in crystalline inorganic materials.

Don't Miss These Articles

IN this issue of FOOD INDUSTRIES is published one of a series of reports on German developments in food processing equipment and technology. As soon as Allied investigators could follow our troops into Germany the search began. Even though German food technology is not always regarded as advanced as American, some rather ingenious methods have been discovered. Don't miss any of this series.

Keep the Trucks Washed

A TRUCK BODY, painted white to advertise food dainties, yet so covered with dirt one could barely read the firm's name, was a poor ad for that company. It looked as if it had not been washed for three months.

Firms that have white truck bodies should keep them clean. If white is symbolic of the delicacy of the foods, then dirty white is a repellant.

Prepare for Food Standards Hearings

THIRTY DAYS' advance notice must be given for any hearing on food standards. That brief time is sufficient to make the needed travel and hotel reservations. It is not enough, however, for industry to do a good job of assembling the pertinent data to be presented at the hearing, nor for preparation of a workable definition of a standard of identity, nor for marshalling effective evidence to justify optional ingredients.

To make an effective appearance at a hearing, the preparation must be long and thorough. Other members of the industry should also be consulted, for an industry-sponsored proposal is more convincing than individual, and perhaps conflicting, proposals. All this cannot be easily done in 30 days. Hence preparations for future hearings should be started at once, unless, perchance, you are willing to abide by the historic concept of a given food as interpreted by government officials.

Coffee Quality Irregularities

THE quality of ground, roasted coffee that some food manufacturers are occasionally permitting to go on the market is nothing short of incredibly bad. Virtually every coffee manufacturer, including some of the best known names in the industry, has offended in this respect at one time or another in recent months.

That flavor has not been maintained at prewar standards, is well-known to all with critical taste, and one can understand the problem of purchasing the proper beans under OPA price restrictions. But, this is no excuse for putting out stale coffee. Freshly purchased vacuum packages of certain well-known brands have proved to be so stale as to be unusable. Some have even been rancid. The same comment goes for less known brands. These comments refer to the first coffee out of freshly purchased pound packages.

If the foregoing irregularities of quality are not corrected, the per capita consumption of tea can be expected to increase notably.

Why Not Get What You Are Paying For?

SCARCELY a week passes without its quota of letters of inquiry from readers who seek advice. Where the information is readily available in these offices the answer is quickly given. Frequently, however, the inquiries sent to FOOD INDUSTRIES would have been better directed to the agricultural experiment station in the state where the firm is located.

We repeat what we have stated heretofore in this department. Each state in the union has an agricultural experiment station, on the staff of which there are many capable men. Some of them are among the best food technologists in the country. Furthermore, these institutions are supported by public taxation. In other words, you are helping to pay the salary of the men who often can be of assistance to you. And usually they are very glad to be of service to the food manufacturers in their respective states. Don't overlook this source of potential aid.

Warning to Sales Managers

A HASTY reading of recent issues of *Notices of Judgment under the Food, Drug and Cosmetic Act* reveals that, war or no war, the Food and Drug Administration has been hot on the trail of careless handling of dry foods such as sugar, flour, meal, grits and the like. While most of the offenders are small concerns there is a liberal sprinkling of well known companies. Some of the firms have lost entire car-load shipments, condemned as human food, but released after denaturing for animal feed. Small salvage there!

Back of the difficulty appears to be an error of corporate organization. Sales departments are usually entrusted with all arrangements after a food has left the factory. And, seldom are sales departments adequately staffed to handle technical problems of proper storage and transportation. For years it has been the custom for most sales organizations to ignore technical men until trouble arises if, indeed, the firm has any well trained employees.

It is necessary to remind sales managers that Section 402 (a) (4) of the Food and Drug Law, in effect places the responsibility on them if they order food stored in places where the food may be contaminated with filth. To be sure, the law does not state that it is the sales manager's responsibility, but where else would responsibility lie when the warehouse is in a distant city?

The remedy for avoiding trouble is to provide for well qualified careful inspection of premises where food is to be stored. This means calling on the technical men from the factory or employment of suitable consultants, and following their advice. It may mean the need of special clauses in warehouse contracts to require the warehouse operator to assume the responsibility of keeping the premises clean, free from insects and rodents. Probably the temporary custodian will rebel. But unless he keeps the place clean in the foregoing sense the owner of the food will be in legal jeopardy and may see his name in *Notices of Judgment*, let alone lose a lot of product.

Molybdenum Deficiency Disease

LITTLE by little, evidence accumulates about the role of trace elements in the metabolism of living things. The term trace element is an easy way to describe a chemical element, small traces of which are essential to life. Usually the amounts are so small that they escape notice for many years.

"Salt sickness" of cattle in the south is due to absence of cobalt in the soil. Animals feeding on the grass in salt-sick areas become weaker and in time may die. Yet, it has been found that as little as 1 mg. of cobalt oxide per day will supply a full grown cow with this essential trace element.

Other trace elements have attracted attention in recent years. Minute amounts of copper in sea water, for instance, are necessary for the reproduction of oysters. Iron is necessary for pineapple growth. Zinc and manganese and boron are likewise indispensable to certain living things. The latest addition to the list seems to be molybdenum. When absent from soil, it causes chlorosis of cauliflower seedlings (C. B. Davies, *Nature* 156, 392, 1945).

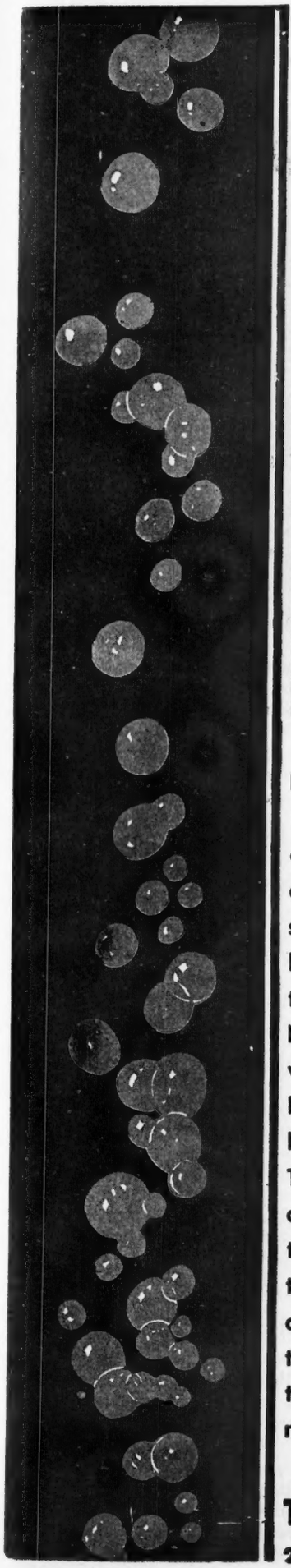
It will probably require many decades before complete evidence is accumulated about the role of all the trace elements. One interesting suggestion is that many food allergies develop as a result of mineral deficiencies in human diets, though we are unable to affirm the validity of this theory. Nevertheless, the whole field of trace element deficiencies is one to be followed with care and, where possible, investigated.

Avoid Stifling Progress

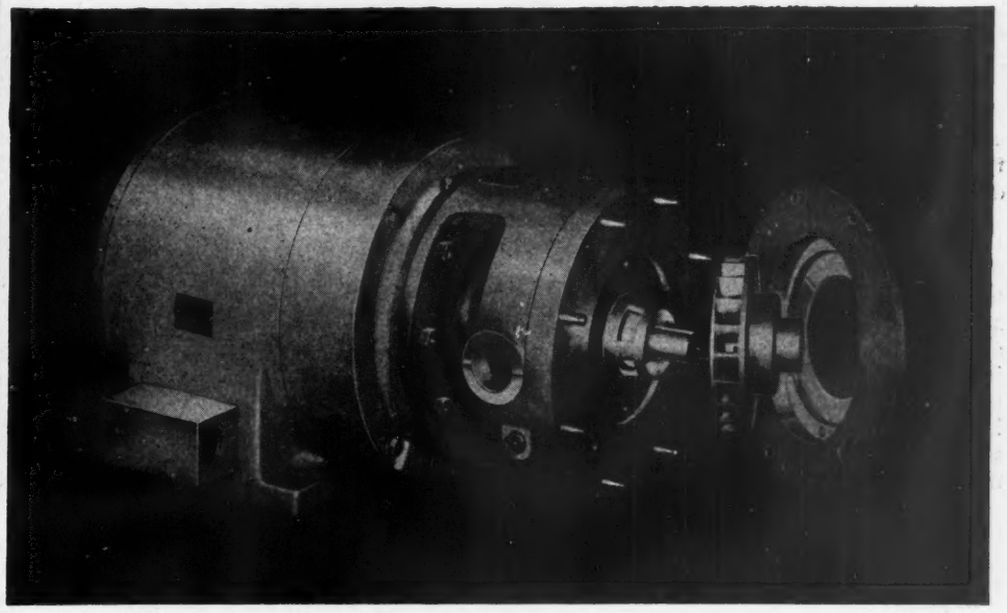
NO one questions the principle of protection of public health or public interest by the Food and Drug Administration, so long as the action is confined within legal and sensible bounds. There is to be noted, however, an increasing tendency of F&DA officials to claim they are the sole judges of what is good manufacturing practice. If such claim is sustained, it then becomes possible for F&DA to decide what can be manufactured and in what manner it may be done—even what may be eaten. Even the course of food research can thus be indirectly affected.

It is very easy to go back into history for precedents for maintaining the status quo of food processing. But that is the very antithesis of progress. Progress means change, but if change is not permitted, progress is stopped—dead.

An age which has unlocked the secret of the atom is not one to cling to the past in food processing. Food regulation must be kept in step with progress, not vice versa.



ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM A NASH COMPRESSOR



Here is a compressor designed perfectly to meet the needs of the Food Plants. It is simple, for it has only one moving part, a rotor cast in one piece and rotating in the casing without metallic contact. This means trouble-free operation over long periods. It is compact and requires little valuable floor space. Its oversize ball bearings seldom require attention or lubrication. No lubrication is required in the interior, so that the air is kept clean from the time it enters the pump. • But this is not all. The compressing medium in the Nash Pump is a rotating column of clean water. The air is in intimate contact with this water in passing thru the pump and is actually scrubbed while it is being compressed. Dust present in the atmosphere is removed, and the air delivered free from dirt, oil, or heat, without the use of scrubbers or air washers. Think what this means in terms of purchase cost and floor space occupied by complicated air washing apparatus. • These pumps are proving their worth in the most trying service. They are ideal for transferring beer or wort from tank to tank by air pressure, for maintaining pressure on aging tanks, for supplying compressed air to bottling machines in racking, etc. • Available in any capacity, these pumps deliver pressures up to 40 lbs. absolutely uniform without storage tanks. • You want the most reliable pumping equipment in your plant, so by all means find out more about the Hytor. Our catalog No. 217 is free on request.

THE NASH ENGINEERING COMPANY

243 WILSON ROAD • SOUTH NORWALK, CONNECTICUT

NEW PACKAGES & PRODUCTS

Red Plaid Cellophane

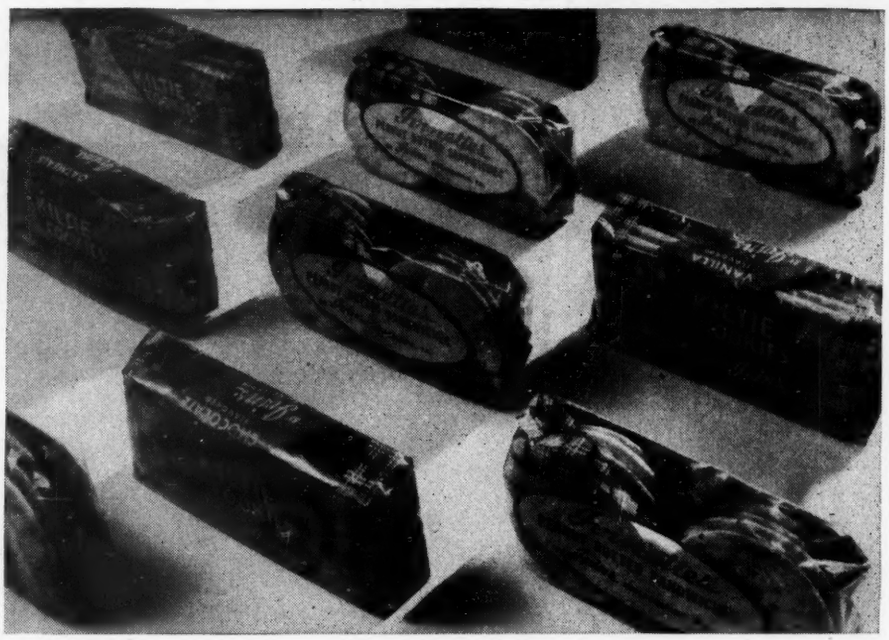
DURING the war, Kiltie Cookies were supplied to Post Exchanges all over the world. Now they are returned and have been introduced to the home front in their bright new Scotch plaid wraps.

There are five types of Kiltie Cookies—chocolate, lemon jumbles, ginger, vanilla and oatmeal. All but the oatmeals are square and molded decoratively.

Six cookies are placed in layers of three on a cardboard stiffiner and overwrapped with gayly printed cellophane. A large solid red arrow zigzags down the center of the package, providing space for the printing of pertinent facts about the product. The red and yellow scheme is carried out to both ends of the wrapper where black is added to make an authentic-looking glen plaid.

This eye-appealing wrapper is easily spotted and can hold its own among the myriad of items appearing on the 5-cent candy and cookie counters.

J. S. Ivins' Sons, Inc., Philadelphia, the manufacturer, has developed similar packages for its sandwich-type cookies and Ivinettes, Peanut Butter Sandwiches. Here, a large yellow oval sports red lettering and a plaid band runs diagonally across the wrapper. A unit contains four sandwiches packed in the same size and shape as the Kilties. Each package is a little over 1 oz.



Back from the Wars

THE canned hamburger that brightened the day for men in foxholes has been dressed up and presented to civilians by the Claridge Food Co., Flushing, N. Y.

Packed four to a one pound tin, the patties are made of U. S. inspected utility grade beef with very little fat. They are thoroughly fried in vegetable oil and are supplemented by a tangy sauce of tomato puree, salt, flavoring and mushrooms. Heating over a low flame in a covered saucepan is all the labor required to prepare this hearty dish.

A blue bull, sniffing green and yellow posies, is the appropriate motif representing the "burgers" on a white paper label. Other printing is in red and blue with the exception of the Claridge name which is done in two shades of green.

Breakfast Tray

CHEERIOS, Wheaties and Kix have been put in 1 oz. packages and packed four, four and two, respectively, in a seal-end carton.

The Betty Crocker Better Breakfast Tray, product of General Mills, Inc., Minneapolis, Minn., has handy perforations allowing easy raising of the side and top, making the individual packages readily accessible.

Full color pictures of three bowls of breakfast foods utilize the space along the top of the tray, while both sides carry reproductions of the orange, blue and yellow cereal boxes.

The one-portion containers are wax-coated and designed like their familiar large-sized mates.

Rich Tidbits

"NEWPORT NUBBINS" is the name Burry Biscuit Corp., Elizabeth, N. J., gives to its light fruit cake cubes that have been bathed in rum and brandy.

The rich, moist Nubbins, individually placed in accordion-pleated, waxed paper cups, are packed in a flat round tin—red with yellow, black and red label. Weight is 1 lb. 8 oz.

Tin Protects Dried Soup

TOMATO VEGETABLE SOUP with Noodles is a recent addition to the Lipton family of Continental Foods, Inc., Hoboken, N. J. It is being test marketed in East Coast areas.

The prepared soup mix is a blend of egg noodles, dehydrated vegetables, dextrose, salt, artificial seasoning, cornstarch, flour, spices, albumin and vegetable gum.

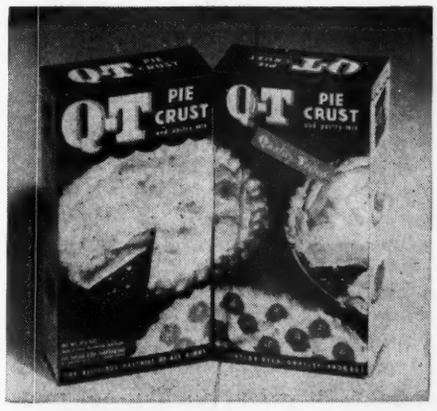
In preparing, the contents are emptied into one quart of boiling water and allowed to simmer for 20 minutes.

Unlike other Lipton soup mixes, this one is packaged in a 202x308 can with printed paper label. Yellow panels on a tomato red ground carry black printing. A full color reproduction of a bowl of soup informs the buyer as to the contents of the can.

Two and a quarter ounces make from four to six servings.

This One Has Eye-Appeal

CLAY-COATED boxboard with a brilliant 5-color Kodachrome reproduction done in very fine screen is the package choice of The Taylor Reed Corp., Mamaroneck, N. Y., in marketing its new Q-T Pie Crust and Pastry-mix.



Portions of three different types of pie are pictured on both front and back so that complete units result when the boxes are arranged on the grocery shelves. Two shades of blue are used as background for the natural-color pastries. The Q-T identification appears plainly in four places. Side panels are devoted to six recipes and bright dishes, such as creamed chicken patties, Scotch shortbread and fruit turnovers.

Eight and one half ounces of this blend of flour, shortening, salt and sugar is said to make enough pastry for a two-crust pie. The addition of 4½ tablespoons of water is all that is required.

For Quick Popovers

MIX-UP POP-OVER MIX, manufactured by the Flour Mix Co., Woodside, N. Y., for Delflo Corp., New York, requires only the addition of a cup of water and one egg.

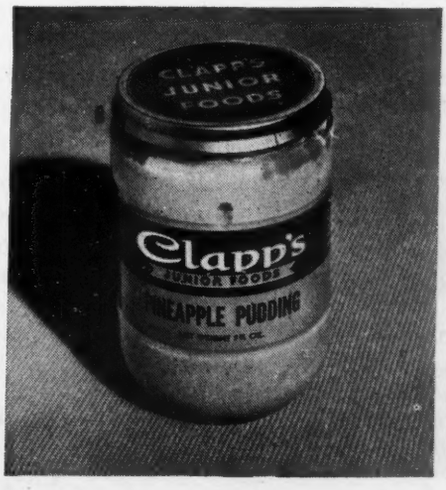
Ingredients, consisting of unbleached wheat flour, powdered milk, salt, dehydrated whole egg and monocalcium leavening, have been packaged in an unsealed paper bag and heat-sealed carton.

The color scheme is red and blue with white printing. And, on this one, the package designer remembered the plea of the supermarkets when he provided the little white square for price marking on top of the carton. Net weight is 7 oz.

Baby Dessert

THE ever growing list of prepared baby foods has been swelled again with the addition of Pineapple Pudding by Clapp's Baby Food Division of American Home Foods, Inc., Rochester, N. Y., and San Jose, Calif.

Classed as a Junior Food, it consists of milk, pineapple juice, water,

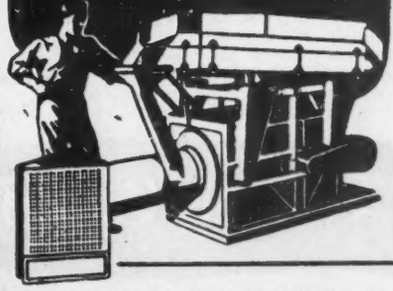


No More $TONE$ in Your Bottle-Neck!

• Now, with critical war shortage of labor, streamline STONING in your mill. Removing stones has always been slow, laborious and costly out of proportion to other steps in processing cereals, soy beans, and other dry foods. To eliminate this great headache of the cereal and other dry food processors, we have developed a new type stoner—revolutionary in design, amazing in efficiency, low in first cost, in operation. Removes stones, glass, non-magnetic as well as magnetic metals, and all other hard, dangerous contaminations from cereals, soybeans, and other beans, and other food products with, 1) an action so sensitive the tiniest particles are easily removed; and 2) operating cost so low it is relatively insignificant; and 3) 99.9% efficiency. Capacity up to 16 tons per hour.

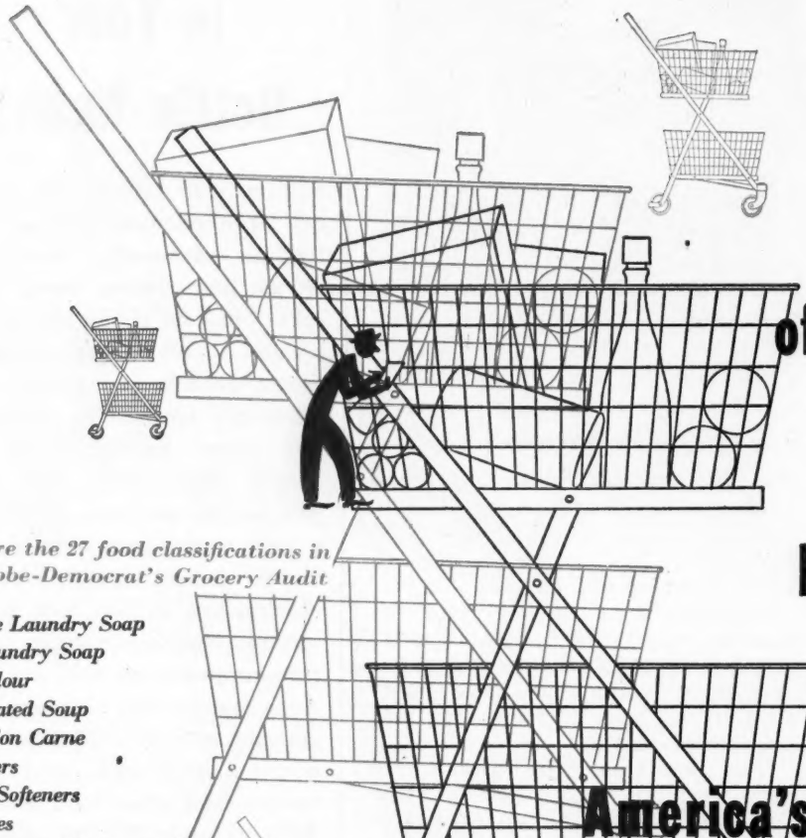
Write for Bulletin FI-446

SS&S AIR-FLOAT STONER



SUTTON, STEELE & STEELE, INC.
DALLAS, TEXAS
In Canada—Kip Kelly, Ltd., 68 Higgins Ave., Winnipeg
Foreign—Separations Engineering, Ltd. 133 Bush House, Aldwych, London

The Globe-Democrat's continuous survey of retail grocer sales has made St. Louis America's No. 1 test market



Here are the 27 food classifications in the Globe-Democrat's Grocery Audit

Package Laundry Soap
Bar Laundry Soap
Cake Flour
Dehydrated Soup
Chili Con Carne
Cleansers
Water Softeners
Bleaches
All Purpose Flour
Pancake Flour
Prepared Flour Mixes
Toilet Soap
Coffee
Instant Coffee
Dry Dog Food
Ready-to-Eat Cereals
Hot Cereals
Shortening
Margarine — Butter — Lard
Evaporated Milk
Peanut Butter
Baby Food
Baby Cereal Food
Catsup and Chili Sauce
Canned Soup
Desserts
Spiced Luncheon Meat

Would you like to know what makes a sales curve go UP? Or down?

To give manufacturers of grocery store products a look-see into the effects of price, packaging, merchandising and advertising, the St. Louis Globe-Democrat Grocery Store Audit was introduced, more than four years ago. This reliable audit now furnishes revealing figures on relative sales positions of more than 450 individual products in 27 grocery store lines in this busy midwest market.

If you're planning a test campaign on a new product, St. Louis is *the* test market to use because the Globe-Democrat Grocery Store Audit gives you a graphic picture of market expectations, as well as sales results. If your product is an old-timer, you need to know what's causing up-and-coming pressure from your competitors.

Write for details . . . *St. Louis Globe-Democrat*, Dept. 103, St. Louis, Missouri.

St. Louis Globe-Democrat.

Only the Globe-Democrat claims to cover successfully the rich and important market of the 49th State, which includes 87 counties in Eastern Missouri and Southern Illinois.

sugar, flour, eggs and salt. The intermediate texture is designed for older babies and young children who have outgrown strained foods.

For the Sweet Tooth

FRESH desiccated coconut, milk chocolate and almonds have been combined by Peter Paul, Inc., Naugatuck, Conn., to make a 2 oz. candy bar called Almond Joy.

Other ingredients include frozen egg whites, sugar, cocoa butter, corn sirup, non-fat dry milk solids, salt and artificial flavors.

The creamy coconut centers are topped with two whole roasted almonds and coated with smooth milk chocolate.

The bar is divided into two sections and placed on a cardboard tray with printed paper overwrap done in buff, brown and salmon.

Redesigned

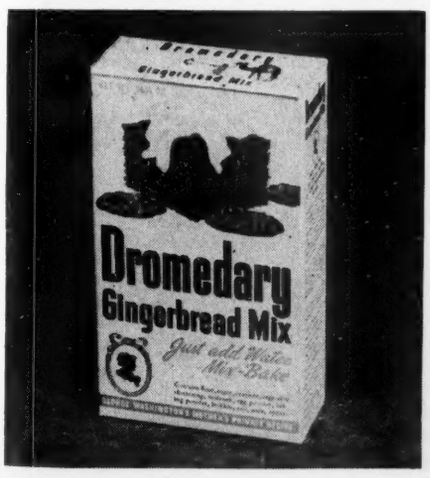
DROMEDARY Gingerbread Mix now appears in a revamped package aimed at appetite-appeal.

On this seal-end, coated boxboard container, the famous Dromedary camel plays second fiddle to a luscious-looking square of chocolate and whipped cream-topped gingerbread flanked by several ginger cookies. White lines run through the yellow background, forming a diamond pattern. Printing is in dark brown.

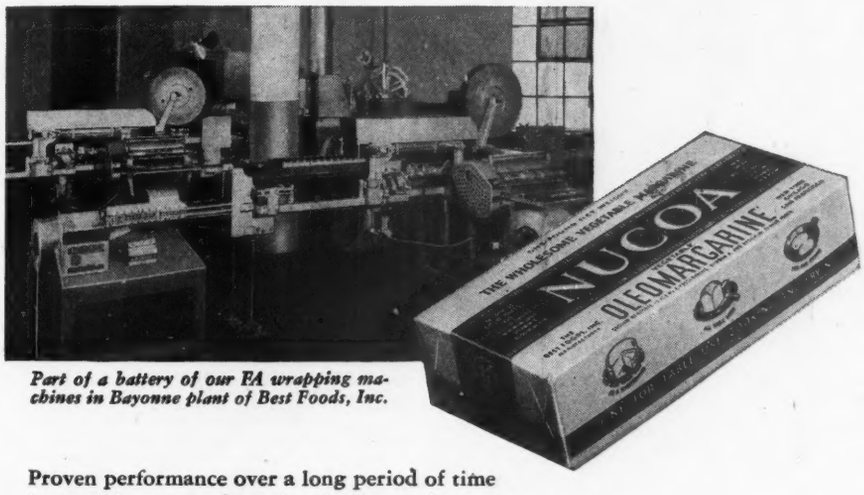
The camel and Arab have been reduced to a minute size and placed on each end of the carton. The Arab points with his stick to the white oval provided for price marking.

The product name and brand appear boldly on five sides, allowing little chance for mistaken identity. Space on the back is taken up wholly with recipes and suggestions.

The Hills Brothers Co., N. Y., is the manufacturer of the gingerbread which is packed 14¼ oz. to the 3¼x 6½x1 5/8-in. carton.



The Best of Wrapping Equipment for BEST FOODS



Part of a battery of our FA wrapping machines in Bayonne plant of Best Foods, Inc.

Proven performance over a long period of time is a most important factor in selecting packaging equipment — for any failure on the packaging line can result in a serious and costly bottle-neck.

It is significant, therefore, that so many leading manufacturers have standardized on wrapping machines built by the Package Machinery Company. The Best Foods, Inc., for example, has used our machines for over 25 years. The FA models with which they wrap Nucoa are, moreover, the most widely used wrapping machines in the entire packaged-goods field.

NEW AND BETTER MACHINES

The machines we are producing today not only offer utmost dependability, but embody improvements that add greatly to their versatility and speed. Most models are quickly adjustable —which means you can wrap a wide variety of sizes on a single machine. They are easily adaptable to any type of wrapping material. And we can build them to produce many different forms of wrapping—combination wraps of several materials; wraps that incorporate a display band, easy-opening tape and price-and-date labels that are printed and applied to the package in the wrapping process. In addition, we are developing a new end-seal mechanism to be incorporated in our FA type machines.

For the latest and finest in wrapping equipment—look to Package.

✓ *Check up NOW on your Wrapping Equipment*

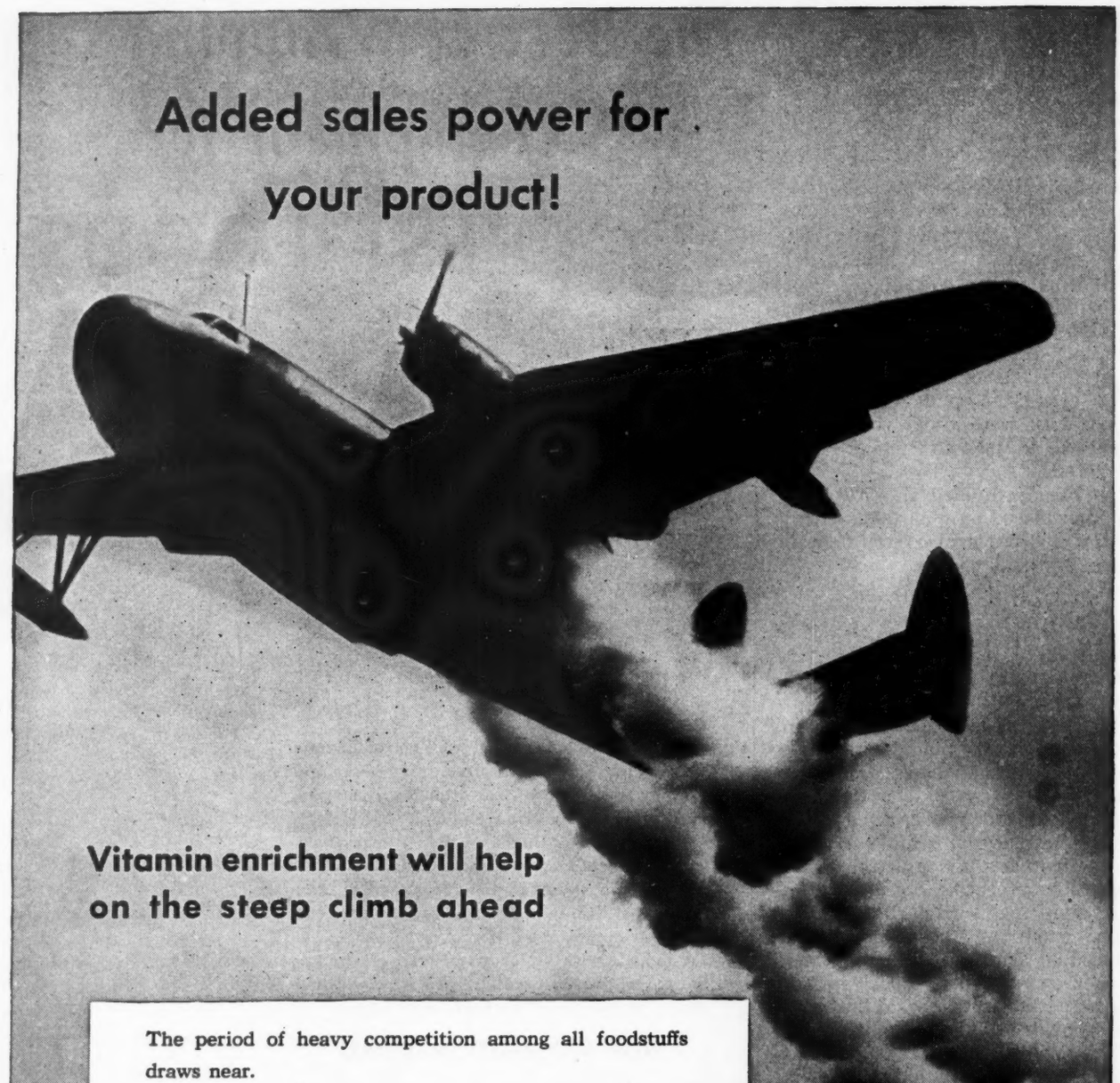
The large number of orders for new and improved machines now on our books shows that packaged-goods manufacturers are keenly aware of the savings and merchandising advantages that result from better packaging methods. We'll be glad to make a survey of your present equipment with a view to giving you a sales-winning package at lowest cost. Just write or phone our nearest office.

PACKAGE MACHINERY COMPANY, SPRINGFIELD 7, MASS.

30 Church St., New York 7 • 111 W. Washington St., Chicago 2 • 101 W. Prospect Ave., Cleveland 15
182½ Spring St., N.W., Atlanta • 443 S. San Pedro St., Los Angeles 13 • 18 Dickens Ave., Toronto 8

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines



The period of heavy competition among all foodstuffs draws near.

Mrs. Housewife of today knows that vitamins are essential food elements for proper nutrition. You can count upon her to check your labels for vitamin declarations. She will buy enriched food values wherever possible.

Be ready to meet this challenge. Study the possibility of improving your product through enrichment with 'ROCHE' vitamins. Let enrichment *help your product on the steep climb ahead.*

"ROCHE" VITAMIN DIVISION

HOFFMANN-LA ROCHE, INC., Nutley 10, N. J.

FOOD INDUSTRY NEWS

GENERAL

West Coast Labor Conflict May Bring Canners Serious Losses

Jurisdictional battle between CIO-F. T. and A. Workers and AFL-Teamsters leaves processors in middle on eve of season

FOR over a year, Northern California fruit and vegetable canners have been handicapped by a labor jurisdictional tug-of-war that, on March 1, erupted into a blockade of canneries in this region. So tight was this blockade, applied by the powerful AFL International Brotherhood of Teamsters, that rail cars and trucks could not leave or enter canneries—a measure that effectively stopped delivery of equipment, machines and fresh produce and created a situation so serious that federal government intervention was deemed necessary to avert serious losses. The current quarrel is between the Teamsters and the CIO Food, Tobacco and Agricultural Workers unions.

Occurring on the eve of California's canning season, this labor rivalry not only has serious current aspects, but portends prospects of future labor actions and negotiations of increasing importance to the industry.

The dispute arose early in 1945, when the AFL executive council, on petition of Dave Beck, western head of the Teamsters, awarded jurisdiction over cannery warehousemen to his union. Later it broadened the award to include all cannery workers in the industry. Prior to this time, cannery workers had been organized by AFL into federal local unions without any national union affiliations. Federal unions are chartered directly by, and are answerable to, the AFL executive council. For collective bargaining purposes, the federal locals were organized into state councils and these state councils negotiated the labor contracts with the canneries. When the Teamsters won jurisdiction, the state councils and constituent locals in Washington and most of Oregon went over to the Teamsters without trouble. Opposition first occurred in California when some of the local unions became independent and others decided to affiliate with AFL Seafarers International Union, which held jurisdiction over fish canneries. Subsequently, the Seafarers surrendered their new affiliates to the Teamsters, but not before jurisdictional picket lines and strikes became rampant during the 1945 canning season. While food losses were slight during these disturbances, the picketed or struck canneries had to divert deliveries of fresh produce to other canneries, and companies forced into this position suffered some production losses.

Adding to the existing confusion, the F. T. and A. Workers then entered the field and, after some campaigning, petitioned the National Labor Relations Board for an election to ascertain which union the majority of workers preferred.

Eligibility to vote in this election was based upon evidence that each voter had worked 25 days or more in Northern California canneries during the 1945 season. Out of some 60,000 seasonal employees, only 23,545 workers were eligible to vote at the elections last October, held at the 61 large canneries employing the California Processors and Growers, Inc., as their labor relations representative. About half the eligibles voted and results of the election gave a plurality to CIO with 6,067 out of the total 12,259 votes cast, which was but 63 short of a majority. AFL received 4,701 votes, 1,291 were challenged and 200 divided between an independent union and a no-union choice. Elections were held in 14 other canneries, not affiliated with CP&G, where approximately 5,000 workers divided their choice between CIO and AFL.

AFL capped this climax by contesting all elections on the grounds that NLRB agents had failed to provide accurate eligibility lists. And, on February 18, the board set aside the 1945 elections and ordered new ones to be held at the employment peak of the 1946 canning season—presumably some time in August. Also contained in NLRB's order were stipulations that, pending the new elections, neither union was entitled to exclusive bargaining rights or a union shop contract and that each may bargain for its members only. The board also instructed CP&G that they were not to negotiate a new exclusive bargaining contract with any union until the dispute between CIO and AFL was settled. This brought the entire situation to a stalemate.

But AFL, exercising its power to tie-up cannery operations, still in-

Press Association

TALKING OVER FOOD CRISIS

The smiles, assumed for the photographer, were not meant to minimize the grave world food shortage that brought together the President and the former President. Because of his valuable experience, gained in relief feeding after World War I, and the great prestige accruing to a former U. S. President, Mr. Hoover is seen as an ideal investigator in the present crisis.

sisted on the union shop status, which followed the absorption of cannery workers' unions.

Any decisions demand careful consideration because CIO, too, has a lever powerful enough to bring cannery operations to a standstill through their United Steel Workers and Harry Bridges' International Longshoremen and Warehousemen's Union. Implications are that these unions might retaliate with a counter-blockade, through their union control over workers in the largest can manufacturing plants, unless their position in this dispute receives satisfactory consideration.

No matter what is done to effect a labor peace, the industry may confidently expect that the first move made then by the union, or unions, will be to demand a new wage contract for cannery labor.

Food Industries Adds New Editor to Staff

FOOD INDUSTRIES announces the editorial staff appointment of Haldane Gee, who became assistant editor on February 25. Dr. Gee brings to his new duties a threefold experience in the academic, editorial and industrial fields.

Prior to joining the staff, Dr. Gee was vice president of Schering & Flatz, Inc., New York pharmaceutical manufacturers, where he had charge of the Sterisol Division, which specialized in ampoule injections for the intravenous feeding of

HALDANE GEE

the sick. This industrial activity covered an 11-year period and included the research, development and production phases of the operation.

The new staff member's editorial experience includes reportorial and editorial work for the daily press, and the preparation of interpretive science articles for popular magazines. He was at one time on the staff of Science Service, the science news syndicate.

Dr. Gee received his Ph.D. at University of Toronto, was fellow of the National Research Council at Yale University, and assistant professor at the University of California. His publications in the scientific journals are in the fields of chemistry, biochemistry, bacteriology and physiology. He is a member of the Society of American Bacteriologists and a charter member of the Institute of Food Technologists.

Among the byproducts of Dr. Gee's recent industrial activity are a number of United States and foreign patents on sterilization methods, containers and closures. One of his assignments on FOOD INDUSTRIES will be special articles on food technology.

"WE'RE EXPANDING CAUTIOUSLY."

Russia Ups Farm Land By 20 Million Acres

THE sowing area for all agricultural products throughout the Soviet Union will be increased by 20,500,000 acres in 1946, under terms of a recent government decree. The planned tonnage for grain was not disclosed, but is believed to approximate the 1940's 38,300,000 tons.

Terms of the Russian decree outline for the farmers how the 1946 food goals have to be met through better fertilization, more efficient sowing and plowing, and through better work on the part of machine tractor stations—which have considerably recuperated after the damage caused by the Germans, who destroyed or took away 140,000 of Russia's prewar 500,000 tractors.

Equipment Deliveries Show Big Improvement

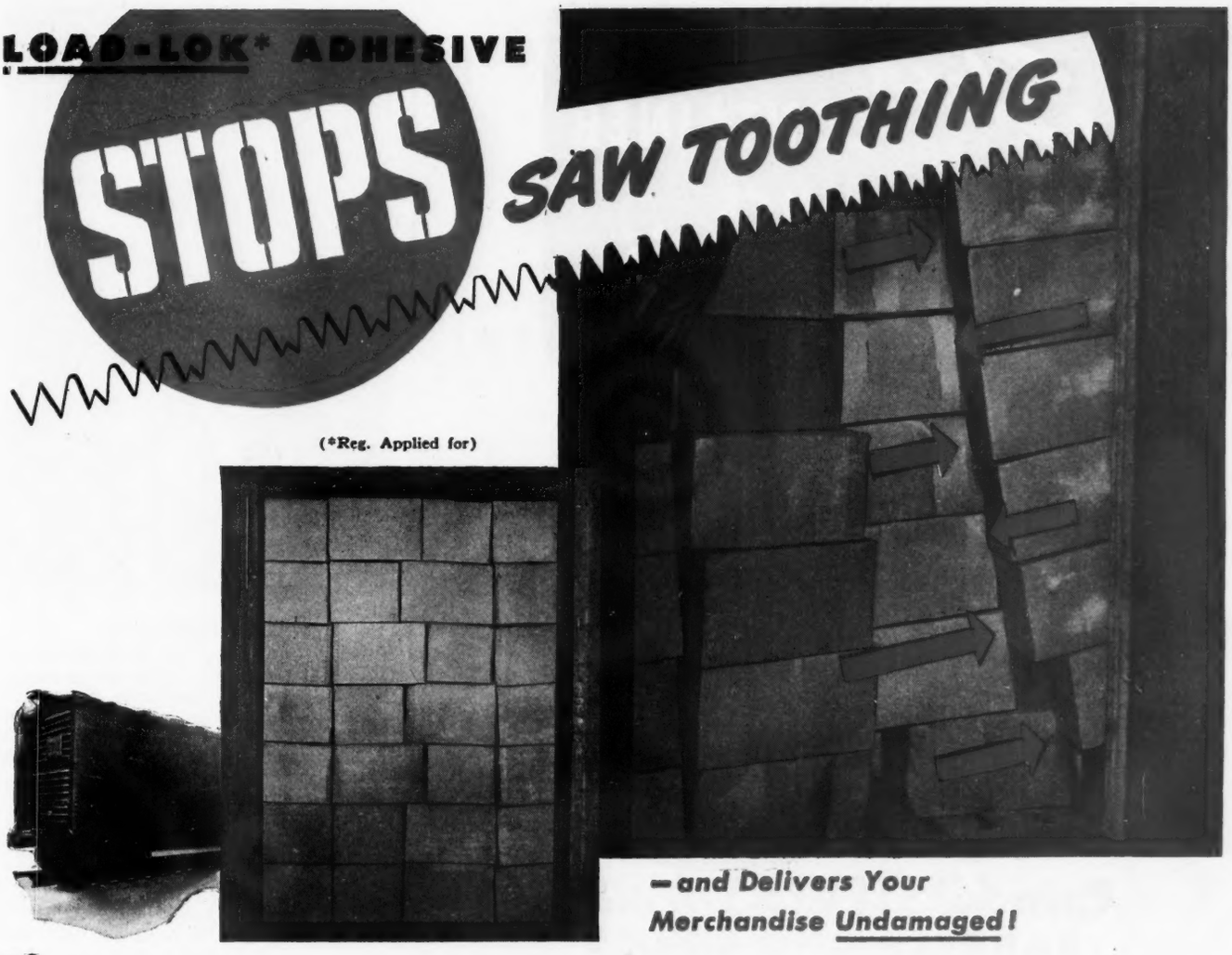
DELIVERIES of equipment and accessories are definitely improved, according to shipping information from manufacturers of food machinery and sundries who had displays, at the 20th Exposition of Chemical Industries, in New York. Availability depends, as usual, on what size the item is, how complicated, and whether specially designed. Whether weeks or months are involved, however, it would seem that current delivery times are half or less of those expected six months ago. Large machinery, requiring two years according to schedules of some weeks ago, may now be available before the end of 1946. Parts for which one might have had to wait a month or two last fall, can frequently be had from stock today.

One manufacturer of steam accessories carries small traps in stock. Dial thermometers may be had in two to three weeks. High pressure or float-type traps come through in four to six weeks. In the case of lift trucks, the delivery situation reflects current labor conditions and special supply problems. One manufacturer can furnish skid trucks in stock designs in from 40 to 60 days. For wooden skids, however, 120 days are

LOAD-LOK* ADHESIVE

STOPS SAW TOOTHING

(*Reg. Applied for)



—and Delivers Your Merchandise Undamaged!

Study the *damaged* shipment photo carefully. Note the jagged carton edges. That's saw-toothing . . . caused by subjecting loose, unglued carloads to vertical oscillation, side sway and car movement shocks. Every carton damages another carton. Here's the proof: 1,116 cartons of canned food shipped from Mississippi to Michigan. Result? 1,102 cartons damaged. Shipment rejected at cold storage warehouse because of mold, odor risks.

Next, study the *undamaged* shipment photo. This shipment was properly unitized with LOAD-LOK Adhesive. Contents: 1,524 cartons of bottled brandy. Distance: California to New Jersey. Outturn Report: "No shifting of lading en transit. Entire load in general good order. No exceptions taken on delivery." That means no breakage . . . clean, safe handling merchandise that'll display well, sell well!

LOAD-LOK is a special National adhesive. It *unitizes* the loading of canned goods, light bulbs, china, bottled goods and all other fragile or crushable materials — in cartons, boxes, bags. Carload and truckload shipments are *unitized* into floating *glued* loads that successfully withstand all shipping stresses and greatly reduce dunnage and bracing costs.

LOAD-LOK is automatically applied in two parallel strips to the bottom surface of each shipping unit . . . which is then lifted off the regular loading conveyor and glued into the *unitized* load. LOAD-LOK has a high shear strength which prevents sidewise or lengthwise shifting of the stowed units. Yet, a single sharp upward blow of the hands, against its low tensile strength, releases each unit for easy unloading. The glue cost is insignificant. And the only equipment required is an inexpensive glue pan installation on your loading conveyor.

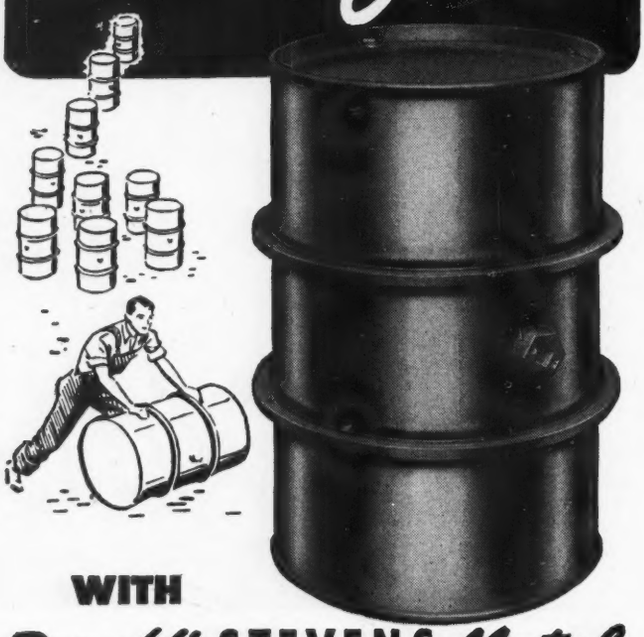
LOAD-LOK has been endorsed by leading carriers. Full details are available in a new handbook: GLUED LOADS. Write for your copy —NOW! Offices: 270 Madison Ave., New York 16; 3641 So. Washtenaw Ave., Chicago 32; 735 Battery St., San Francisco 11; and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto. In England: National Adhesives, Ltd., Slough.

Dunellen Plant

National ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

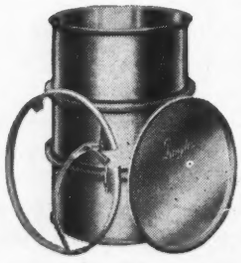
Slash CONTAINER MAINTENANCE Costs



WITH

Republic STEVENS Metal BARRELS AND DRUMS of ENDURO Stainless Steel

Down come container maintenance costs when you use barrels and drums of Enduro—because this lustrous metal resists corrosion, resists hard use and abuse, never needs repainting or refinishing and lasts indefinitely. Enduro is safe to use, too, because it neither affects nor is affected by most chemical and food products.



You'll find just the style and size you need in the Republic* STEVENS Line. Write us for further information.

★ ★ ★

Easy to open—easy to close—that's the patented Ringlox closure shown at the left. It insures a positive and permanent seal—and you may have it on STEVENS Products.*

**U. S. Patent No. 1792281*

NILES STEEL PRODUCTS DIVISION
REPUBLIC STEEL CORPORATION
NILES, OHIO

REPUBLIC STEEL — SERVES THE WORLD

Republic STEVENS
METAL BARRELS AND DRUMS

JOINS COCA-COLA

Dr. O. E. May has resigned as chief of the bureau of agricultural and industrial chemistry, Department of Agriculture, to join the Coca-Cola company as an executive in their chemical control division. He is succeeded in USDA by Dr. L. B. Howard, who stepped up from the post of assistant chief, to which he was appointed last November.

required owing to the lumber situation. Another manufacturer, whose line includes lift trucks, has had a strike for several months. He was only a month behind when his plant was struck.

Filter presses of average construction are now promised in four months where deliveries previously took six months. This is the experience of one of the largest manufacturers. Some of the makers of smaller presses can offer delivery in two months.

On tanks and processing equipment, deliveries vary widely with method and material of construction, as is to be expected. By using stock sizes or simplifying the design, however, it is possible to get delivery in half the time otherwise required. A manufacturer of ceramic tanks, for example, offers round tanks in three months, but requires six months for squares.

Heavier and more complicated machinery may take from six months to a year. One maker can furnish a double ribbon blender, with special sanitary features for the food field, in about seven months. This equipment is of three cubic feet capacity, suitable either for pilot operations or small scale production.

Sifting equipment is promised in eight months by a manufacturer of a varied line of products. His rope

BETTER SELLING BEGINS WITH BETTER PACKAGING!

Selling begins with the package, and better selling calls for A. C. M. Clay Coated Cartons. For these famous cartons give any packaged product a better *"sales front."* Their velvet-smooth surface, produced by an exclusive, continuous process, adds luster and brilliance to any design, makes it stand out in today's competition for eye-buying shoppers. Put your product at the head of the sales parade with a better package —an A. C. M. Clay Coated Carton!

AMERICAN COATING MILLS, INC.

Main Offices—Elkhart, Indiana.
Branch Sales Offices—Wrigley Bldg., Chicago;
271 Madison Ave., New York City.
Paper Mills and Carton Plants—Elkhart, Chicago.

MARKS OF A. C. M. SUPERIORITY:

Whiter board—
velvet-smooth surface—more rigid—
tougher—better folding qualities—
superior reproduction in either letter-
press or lithography.

The Secret is in the SURFACE

AMERICAN COATING MILLS

A.C.M. CLAY COATED CARTONS AND CARTON BOARD

What's your hardest cleaning problem

Whatever it is, there's a Wyandotte Cleaner ready to help you lick it.

Even as tough a job as short time heat exchangers cleaning is simplified by proper use of Wyandotte S. R. 10* and Wyandotte G.L.X.* These safe and effective compounds work with speed and thoroughness, doing no damage to any metal surface.

Teaming up with them is an all-star cast of other products—a particular cleaner for each particular job—for all kinds of equipment and maintenance cleaning in food plants. And for a final germicidal treatment nothing comes up to Wyandotte Steri-Chlor* as a rinse or spray.

The Wyandotte Representative will gladly place his training and experience—plus the results of ceaseless Wyandotte research—at your disposal. Call him at any time.

*Registered trade-mark

Wyandotte

REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION
J. B. FORD DIVISION
Wyandotte, Michigan
Service Representatives in 88 Cities

drives also require eight months. Some shipping dates are delayed by shortage of motors, which may entail a nine months' delay.

Some of the suppliers will not quote probable shipping dates at all, or else offer schedules contingent on unknown or uncontrollable factors. A steel fabricator, making a variety of types of equipment, including roasters, offers to ship "Four to six weeks after receipt of steel." This is understood to mean September under present conditions.

Packaging equipment has been exceptionally difficult until recently, with two year planning common. One manufacturer who specializes in bottling equipment, however, is now hopeful of shipping some units well within 12 months, including a newly-improved air blast cleaning machine. The official shipping promise is "when ready," but completion may be expected before the end of the year.

Instruments and control devices are still long term propositions, although not all manufacturers are similarly situated. Simple indicating devices are not a problem unless needing special metals, as for corrosion resistance. Moisture indicators, pyrometers, pH recorders, are promised in three months by one of the instrument houses. Another company ships flow rate indicators in 60 days, unless specially designed, in which case, allow four months. Delays in the case of equipment involving electronic devices may still be long ones, however. In the case of one nationally known manufacturer of precision control instruments, the scheduling problem is still troublesome, with unsolicited orders complicating the situation. This company's state of mind is indicated by their representative's reaction to a suggestion that one of their new devices should have an immediate application in the food field. "That, unfortunately," he said, "could only result in another order."

Bakery Engineers Tell Long Term Problems

PRODUCT improvement, quality control and reduction in operating costs as the best means to successfully meet the inevitable postwar changeover to a buyers' market were emphasized at the 22nd Annual Meeting of the American Society of Bakery Engineers, held in Chicago, March 11 to 14. Quality control was defined to include sanitary practices, intelligent handling of personnel, use of up-to-date methods and equipment, and adaptability of procedures to 80

THE *Story* BEHIND . .

This book of Better Packaging doesn't actually exist. But if you put all of Pneumatic's packaging experience and knowledge between two covers you would be able to find the one best answer to almost any packaging problem you might meet.

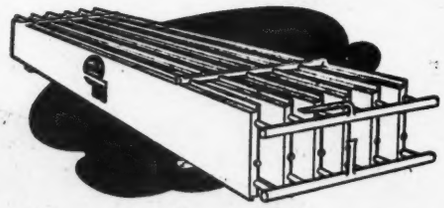
A leader in the field for over fifty years Pneumatic has developed machines to package many different types of products. All of them have been time and production tested, and perfected to a peak of "lower cost per container" operation.

The Hi-Speed Carton Feeder and Bottom Sealer pictured is typical of the Pneumatic equipment being used every day in the better known production lines throughout the nation. Pneumatic builds complete machinery hook-ups for carton feeding, forming, sealing, tucking, weighing, filling, closing, and wrapping at speeds to meet your needs. Write for details; your inquiry will be given immediate and expert attention. Pneumatic Scale Corporation, Ltd., 91 Newport Ave., North Quincy 71, Massachusetts . . . Also branch offices in San Francisco, New York, Chicago, Los Angeles.

PNEUMATIC
PACKAGING AND BOTTLING
MACHINERY

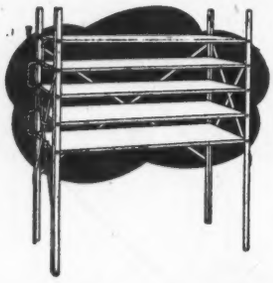
DOLE

Vacuum Plate



Dole Locker and Storage Plates Available in different sizes.

REFRIGERATING UNITS



Quick Freeze Plate Unit Available in different sizes.

for

- **QUICK FREEZING**
- **PRESERVING**
- **TRANSPORTING**

FOOD

Dole plates are used and recommended by outstanding Refrigeration equipment manufacturers. Used by the Government for Cold Storage Rooms in the U. S. A. and Foreign Bases.

Write for Catalogs, Engineering assistance or a representative to call — no obligation

DOLE *Vacuum* COLD PLATES

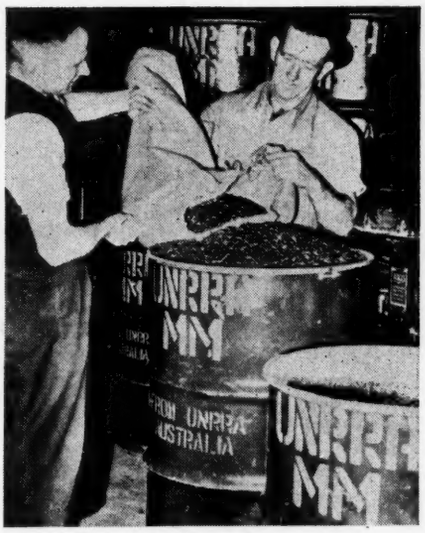
DOLE REFRIGERATING COMPANY
5910 N. Pulaski Rd., Chicago 30, Illinois
N. Y. Branch: 55 W. 42nd St., New York 18, N. Y.

IT'S *Easy Sailing* WITH **Spiceolates**
THE BETTER SPICE FLAVORS

You don't have to wish for better Spice Flavors. SPICEOLATES is the answer!

D&O

DODGE & OLCOTT, INC.
180 VARICK STREET, NEW YORK 14, N. Y.
BOSTON • CHICAGO • PHILADELPHIA • ST. LOUIS • LOS ANGELES
Plant and Laboratories, Bayonne, N. J.



AUSTRALIA ALSO GIVES

Seven and a half tons of vegetables were recently packed in steel drums, at Sydney, to form Australia's first UNRRA contribution for relief and rehabilitation in the Philippines.

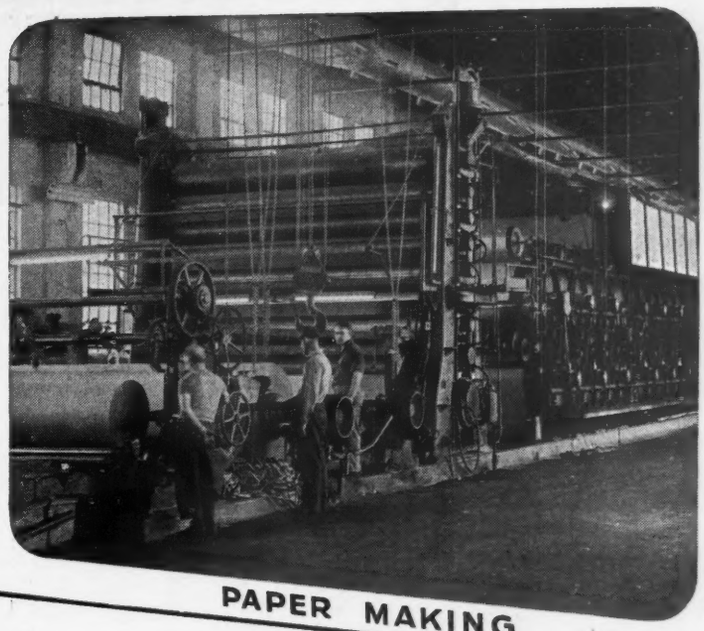
percent extraction flour, as well as to raw material purchases and production practices.

One of the serious problems facing the industry today is that of maintaining the quality of the baked products despite existing shortages of satisfactory ingredients, according to Louis E. Caster, president of Keig-Stevens Baking Co., Rockford, Ill., and formerly president of the A.S.B.E. He counseled that the baker would be better off in the long run to eliminate products for which he is forced to use inferior ingredients rather than attempt to produce an inferior product.

Fred L. Cobb, chairman of the board of the American Bakers Assn. and president of Cobbs Sunlit Bakery, Green Bay, Wis., recommended the use of a standard 1-lb. loaf in a 9-in. pan instead of the varied weights and sizes of bread loaves made today. This smaller loaf would be consumed while still fresh. Wm. E. Doty, Sierra Madre, Calif., reported that in a survey made two years ago, 85 percent of the people bought bakers' bread for convenience and 5 percent bought it because they liked it. A survey was made on the Army garrison bread which showed that 93 percent of the Army wives bought it because they liked it. Army bread is made from young straight dough with a high percentage of salt (2½ percent), 72 percent extraction flour; 5 percent shortening and 6 percent milk solids.

Sanitation control, attained by thorough cleaning of equipment and elimination of contamination from rodents and insect infestation by the use of fumigants, systematic main-

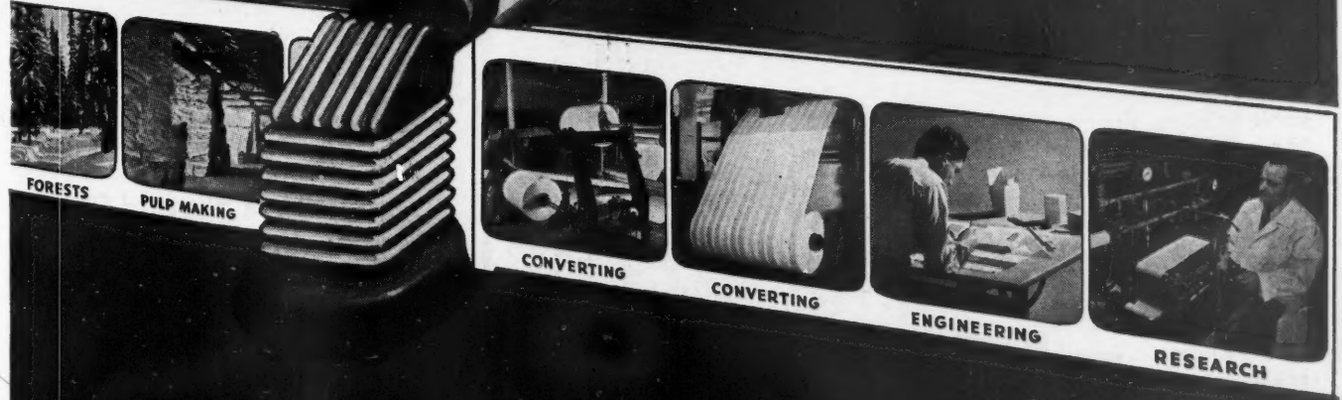
The quality of a package is the final reflection of many stages of production. It starts with the forest tree itself . . . then the quality of the pulp . . . the paperboard . . . the protective coatings . . . the construction . . . the design . . . the printing . . . the engineering skill that determines the requirements for proper protection. At Marathon all these elements of manufacture are integrated in one single process of production . . . with complete unification of quality control. Which is why Marathon is so well able "to build the package for the job."



PAPER MAKING

MARATHON INTEGRATION MEANS

Complete Quality Control



MARATHON

***Controlled Flow* of ingredients produces stable emulsions**

INGREDIENTS flow from individual supply compartments into the emulsifying-homogenizing devices of the Case unit.

The flow of combining ingredients during the controlled processing is separated into fine streams and re-woven repeatedly and continuously until a perfect product emerges ready for packaging.

This Case patented process assures fine, firm stable products, the manufacture of which is under the definite control of the one operator only who does the entire work.

A modern 1946 model of the Case Emulsifier-Homogenizer is the answer to your problems of increased quality products on an economical basis.

Orders are now being entered for shipments within 30 days ... installation now means readiness when sugar, oils and other materials are more plentiful ...

CASE EMULSIFIER-HOMOGENIZERS are designed to produce:

Mayonnaise
Salad Dressing
Thousand Island Dressing
Health Foods
Sandwich Spreads
Peanut Honey Mixes
Toppings
Icings
Flavorings
Extracts
Sauces
Syrups
Infants' Foods

And Every Other Type of Product Requiring Perfect Emulsifying-Homogenizing

ASK FOR PLANT DEMONSTRATION

CASE

EMULSIFIER-HOMOGENIZER

A. T. CASE CO.

1510 California Avenue, Monrovia, California

tenance of the building and regular inspection by a full-time sanitarian, is essential for approved plant operation. Emphasis was placed on the future designing of equipment that can be taken apart and cleaned easily.

Officers elected by unanimous vote at the meeting were: President, Guy T. Shiverdecker, Dayton Bread Co., Dayton, Ohio; 1st vice president, J. M. Albright, Miller-Patton Baking Co., Rockford, Ill.; 2nd vice president, Carl W. Steinhauer, Union Steel Products Co., Albion, Mich.; secretary-treasurer, Victor E. Marx, Chicago (re-elected).

Government Cannery Declared Surplus

A U. S. Department of Agriculture cooperative cannery at Oroville, Wash., has been declared surplus government property and is for sale or lease to private concerns.

Leased during the war to Okanogan Valley Growers, Inc., the cannery consists of a one-story cannery building, one-story warehouse, office building, office and weigh building, four-car garage, temporary boiler building, and a partially constructed permanent boiler building. Buildings generally are of frame construction on concrete footings. The land site is slightly more than two acres.

Buildings are equipped with scales, steam pump, a lathe, drill press and miscellaneous cannery machinery. Utilities are provided by local companies, and transportation is provided by a railroad spur siding.

Specific details about the cannery are available at the War Assets Corporation Regional Office, Columbia Building, Spokane, Wash. General information is available at any War Assets regional office.

Soviet Food Output Stays Short of Prewar

BECAUSE of the extent of war damage to crops and food-processing factories, food production in the Soviet Union in 1946 will not reach its prewar level, the People's Commissar of Food of the USSR has reported.

Under the new Soviet Five Year Plan, provisions have been made for the extensive rebuilding of the food-producing business. Twenty-four destroyed canning factories are to be rebuilt, and nine new ones erected.

It is hoped to increase sugar production by 20 percent, compared with 1940, through the erection of seven new sugar refineries. Fifty-nine are currently being rebuilt.

The one commodity that the Rus-

Low Cost Operation!

York CONTINUOUS Fast Freezer

Here are the outstanding efficiencies of the York Continuous Fast Freezer which lead to lower production costs:

★ Completely automatic. More product can now be frozen with less manpower. From inspection belt to the final packaging of the frozen product all food handling is eliminated.

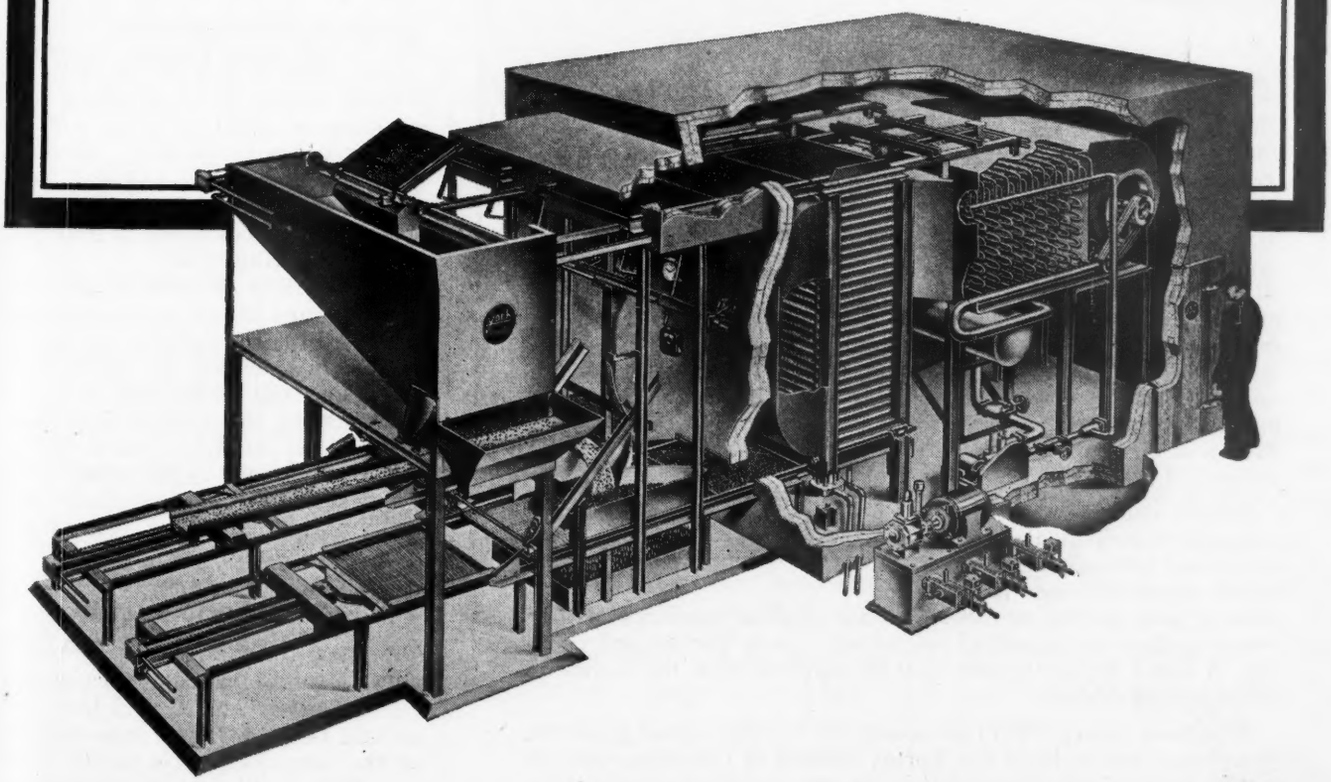
★ Minimum dehydration. Loose product enters freezing column directly from flume line. The ice film, formed on product, provides protection during freezing and storage.

★ Rugged design of entire equipment minimizes maintenance costs.

★ Rapid, "lunch hour" defrosting. Freezing column need not always be emptied.

★ Provision can be made for bulk freezing utilizing the same refrigeration and air circuit.

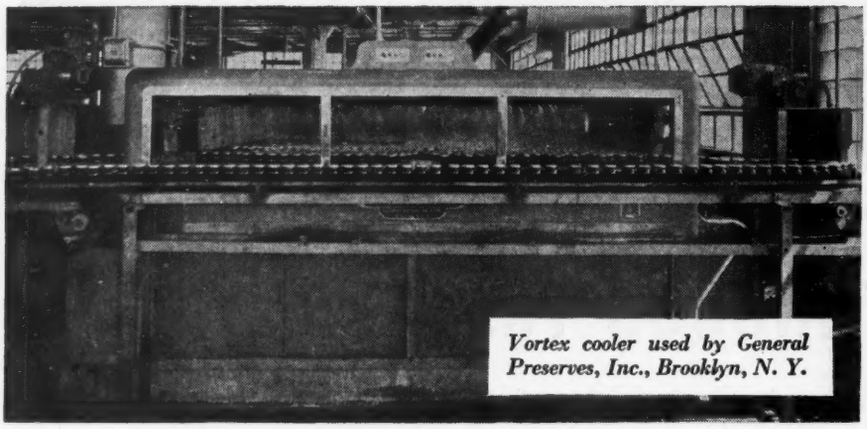
York Corporation, York, Pennsylvania.



YORK REFRIGERATION AND AIR CONDITIONING

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

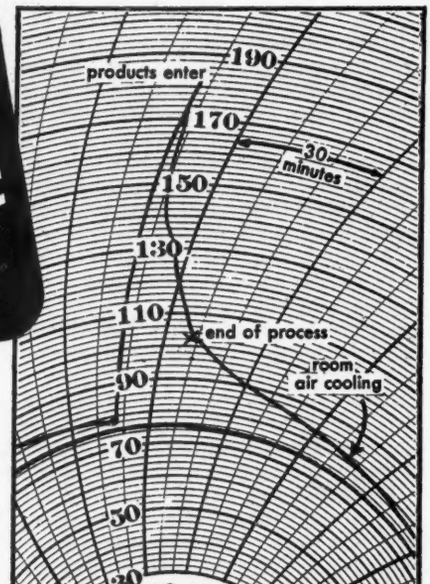
York refrigeration air conditioning



Vortex cooler used by General Preserves, Inc., Brooklyn, N. Y.

Your Hot Packaged Foods Deserve

VORTEX Automatic Cooling



The process recorded above is cooling 1 lb. hot marmalade jars 80° F. within 20 minutes to packing temperature.

Automatic cooling of your products deserves scientific treatment to preserve the original flavors and clarity by *positive* control of time and temperature.

The Vortex system is entirely automatic in operation and can be run continuously without operators, requiring only routine maintenance. The heat exchange medium is atomized water, distributed over the containers in such a manner that maximum cooling is achieved with a minimum quantity of water.

Vortex coolers are widely adaptable to individual requirements and have an almost limitless capacity range for all sizes of jars, bottles or cans. The use of these machines greatly conserves floor space and allows for immediate labeling and packing. A rapid drying system can be supplied with the discharge conveyors, if desired.

Whatever your problem of cooling—or heating—your products, it will pay you to learn the Vortex method of achieving uniform results economically. Send us your process requirements and write for bulletin No. 87 today.

BARRY-WEHMILLER MACHINERY CO.

1946 . . . Our 61st Anniversary St. Louis, Mo., U.S.A.

APPLE JUICE TEST

Apple juice is preferred in glass bottles by nine out of ten housewives, according to a survey conducted by the Home Makers Guild of America for the Owens-Illinois Glass Co. In any case, they show us plenty of juice in the picture, sent along with the story.

sians are hopeful of soon having back on a prewar level is butter. Forty-three new factories for butter processing are planned. Twenty-eight, destroyed by the Germans, are presently being rebuilt.

Citrus and Vegetable Course Opens in Tex.

A NEW school of citriculture and vegetable production, which will include courses in packing, dehydration, canning, quick-freezing, and use of citrus byproducts, has been opened by Texas College of Arts and Industries, Kingsville.

The school is the first of its kind in Texas, and college officials say the school will give students an opportunity to specialize in production,, processing and marketing.

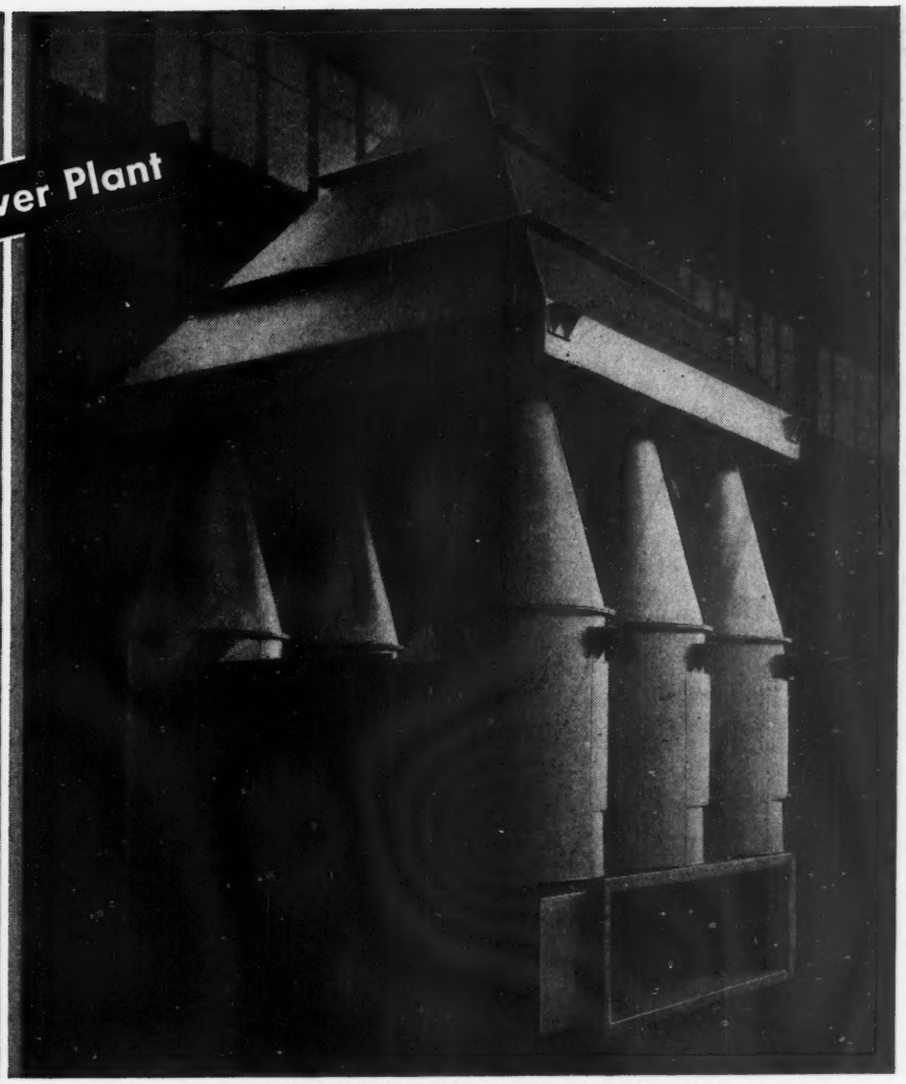
A total of 460 acres of land near Weslaco in the Rio Grande Valley has been obtained by the school from Rio Farms, and here students will study part of the third year of the four-year course.

GF Moves Certo Plant; Seeks Research Site

THE General Foods Corporation plant, Fairport, N. Y., will be closed around October 1, and manufacture of the company's apple pectin product, Certo, will be concentrated in the plant at Albion, N. Y.

Contemplated for several years, decision on the time of closing was reached recently, Lester A. Pridgeon, acting plant manager, and also man-

The Modern Power Plant



Buell Fly Ash Collector for power plant of southern paint and plastics manufacturer

USES BUELL FLY ASH PROTECTION

In modern power plants throughout America, Buell van Tongeren Fly Ash Collectors have a reputation for "high efficiency, low maintenance, long life."

Many Buell installations have been in continuous operation for five or more years at no expense of maintenance or repair. Pictured above is a Buell Collector that was installed in the plant of a Southern paint and plastics manufacturer, for the collection of fly ash from a bark burner. It has been in operation since May 1941.

Buell serves many divisions of industry. Among them for example is one of the country's largest steel companies, a U. S. Navy Yard, a famous brewery, and a leading electric light and power company. In fact, Buell installations cover a cross-section of industrial America.

Executives and engineers are invited to write for specific Buell Fly Ash Collector information, together with a copy of its comprehensive bulletin—"The van Tongeren System of Industrial Dust Recovery."

BUELL ENGINEERING CO., INC.
Suite 5000
8 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

CONSULT BUELL *First* IN DUST RECOVERY
FOR CHEMICAL • ROCK PRODUCT • METALLIC • FOOD • FLUE OR ANY OTHER DUSTS

buell
DUST RECOVERY SYSTEMS

LAMSON Conveyors Streamline WARE-HOUSING for

SMART and FINAL COMPANY Ltd. Los Angeles, Calif.

- Handling Costs cut to .7%!
- Volume handled increased 350%!
- Cost of maintaining adequate inventory reduced!
- Service to customers speeded up!
- Delivery costs cut!

Mr. A. W. Lutz, President of Smart & Final Company, Ltd., has written the story of these remarkable gains—we've reprinted it in a folder—"Our Streamlined Warehouses Lower Our Operating Costs." Mr. Lutz, a practical wholesaler of wide experience, tells the why, how, when, and where of warehousing. Send for your COPY today.

LAMSON CORPORATION
1050 Lamson St. Syracuse 1, N. Y.

I'd like to know how the other fellow is streamlining his business. Send that Lutz booklet along at once!

Name .....

Company .....

Address .....

ager of the company's Jell-O plant at LeRoy, N. Y., said. Eighty-five persons are employed in the plant, to whom termination allowances totalling $55,000 will be paid. The property, consisting of a main three-story building, boiler plant, warehouses and office buildings, has been offered for sale.

The company is also inspecting several sites in suburban New Jersey with a view to transferring its central laboratory, now located in Hoboken. An option has been taken on one site in Milburn. This is in line with the general industrial trend toward more pleasant working conditions for laboratory personnel. It will also meet General Foods present need for expansion of its central laboratory, which is not possible at the Hoboken location.

DISTRIBUTION

See Freezer Shortage As Occupancy Grows

A SERIOUS shortage of freezer storage space threatens. Freezer space occupancy stood at 83 percent, according to the February 1 figures. This is 6 percent above the average and only 2 percent less than 85 percent occupancy generally considered the critical point.

The danger of a freezer space shortage is not yet generally recognized either in or out of the government. It is a byproduct of the government plan to force the early marketing of poultry, hogs and beef cattle as a grain conservation measure. The real trouble spot, just showing up, is caused by the tremendous movement of poultry to market.

Stocks of frozen poultry have been very great. The meat strike did not result in any decline in the quantity on hand, amounting to 364,310,000 lb. on February 1. This compares with 322,000,000 lb. in storage on December 1. There has been a continual in-movement since that time. The volume of poultry in freezer storage on February 1 "broke all previous records" and amounted to slightly more than combined total of beef and pork in freezers on that date.

In view of this heavy supply of all poultry already in storage, the nation's poultry canners will be called upon to process a substantial part of the dressed poultry purchased by the USDA for price-support purposes. Under this plan the canned poultry can be stored for reasonably long periods in ordinary storage space of which there is plenty available. This

Seeing it in Glass Containers *is Believing*

THE "show me" spirit of modern housewives helps them to be thrifty shoppers and gracious homemakers. They like to see what they're buying and they like containers that tell them at a glance when the supply is running low. That's why they prefer to have their foods packed in Anchorglass Containers.

The Anchorglass Container displays your product with all its colorful eye and appetite appeal and, since it imparts no foreign tastes or flavors, it delivers your choice foods to the consumer without losing any of the original goodness packaged at your plant.

The Anchorglass Container is easy and safe to open and can be tightly resealed to protect unused portions of food. It's a convenient, sanitary, attractive package that honestly reveals the nature and quantity of its contents.

Investigate the Anchorglass Container. The housewife prefers it and it offers you the solution to many of your packaging and merchandising problems.

Listen in ANCHOR HOCKING'S HOBBY LOBBY CBS NETWORK . . . THURS. EVE.

Anchor CONTAINERS and CAPS

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

RYERSON STEEL IN STOCK

Principal Products Include:

Bars • Shapes • Structurals • Plates • Sheets • Floor Plates • Alloy Steels • Tool Steels • Stainless Steel • Screw Stock Wire • Mechanical Tubing • Reinforcing Steels • Shafting • Babbitt • Nuts • Bolts • Rivets • Welding Rod • Etc.

Call Ryerson for any kind, shape or size of steel you need. Steel for manufacturing, maintenance or construction . . . all products are available for immediate shipment from any one of the ten convenient Ryerson Steel-Service Plants. Ask for a stock list . . . your guide to steel.

JOSEPH T. RYERSON & SON, INC.

STEEL-SERVICE PLANTS AT: CHICAGO, MILWAUKEE, ST. LOUIS, DETROIT, CLEVELAND, CINCINNATI, BUFFALO, BOSTON, PHILADELPHIA, JERSEY CITY

ACCURACY IN TESTING DEHYDRATED FOODS *for Moisture*

The STEINLITE 40 gram One Minute Moisture Tester

The STEINLITE electronic moisture tester is accurate for four reasons: (1) It is checked and calibrated against official oven methods. (2) It is designed and built by an organization of electrical engineers—pioneers in the radio field. (3) Materials are the finest obtainable — workmanship by skilled craftsmen — inspection rigid. (4) The Steinlite is about as easy to operate as a radio. No previous experience necessary to get accurate readings.

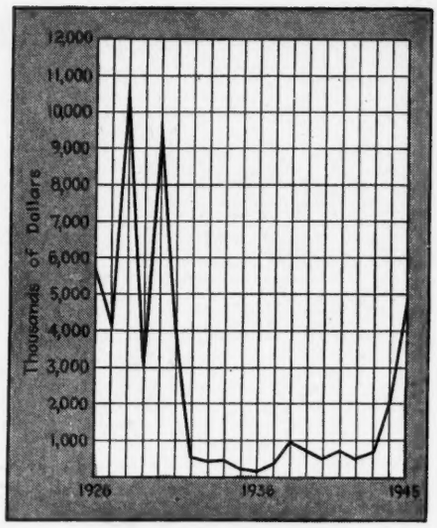
The Steinlite is a production control instrument and not a laboratory instrument alone.

Free trial, no money down, immediate shipments.

Ask our engineers to help solve your moisture testing problem.

SEEDBURO EQUIPMENT COMPANY

634 BROOKS BUILDING CHICAGO 6, ILLINOIS



STORAGE CONSTRUCTION
This chart shows the upswing in refrigeration and cold storage warehouse construction in 1945 after a lull from 1932. Only projects of $40,000 or more are reflected here.

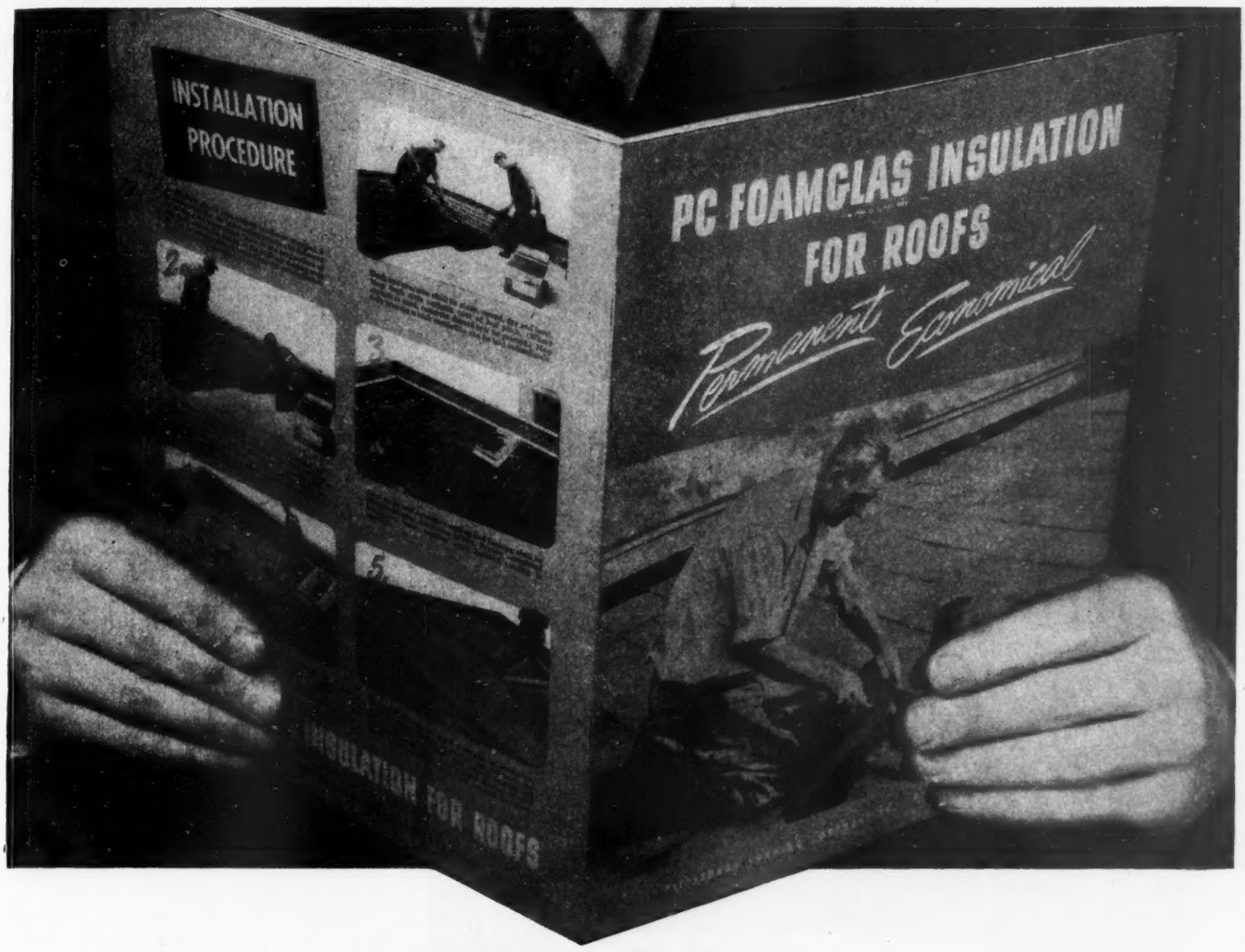
will also help in the disposition of poultry to foreign outlets, few of which are equipped to handle poultry in frozen form.

Inventories of frozen fish in freezers and cold storage establishments throughout the country are still abnormally high, totaling about 115,000,000 lb. on February 1, or 47 percent above average holdings for this season.

Officially and for publication, the Department of Agriculture states that freezer space is not likely to become well filled before early fall with normal in and out movement; at the same time, however, they point out that with the exception of the Pacific region, freezers are better filled than they were a year ago. Officials who have access to up-to-the-minute information on the cold storage situation are apprehensive. On February 1, in 8 of 18 cities, freezer occupancy ranged from 91 to 95 percent; on October 1, only 4 were in the 90 percent and over class.

It has been suggested that the one way out would be to give all the frozen poultry to UNRRA. This would mean, of course, that it would have to be repacked in tin, which is not too plentiful at this time but for which the necessary priorities would be given.

In March and April, supplies of frozen fruits and vegetables will go down. This is the normal seasonal trend. At the same time, there will be a slight increase in the supplies of butter moving into freezers. Egg-drying contracts are expected to take up the flood of eggs. If the supplies of frozen poultry can be held at or below present levels, all that will have to be watched is the abnormal



Get this *FREE BOOK* of Roof Insulation Facts

WHEN you have a roofing problem that includes insulation it will pay you to have this book.

It tells you how to select PC Foamglas blocks of the proper thickness to do each job most efficiently and economically.

It contains complete engineering data, all the facts you want about PC Foamglas. The text is supplemented by graphs, charts, tables, and pictures of actual roof insulating jobs.

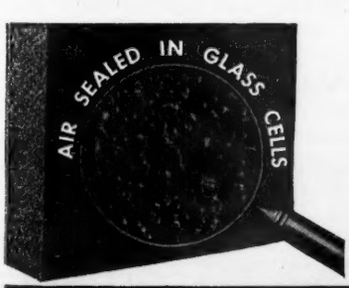
On the roofs of more and more food plants PC Foamglas Insulation is meeting extreme conditions effectively, economically.

In all sorts of plants, on tanks and processing equipment, in ceilings, floors and core walls, this cellular glass insulation helps to maintain temperature and humidity levels, to control condensation—*permanently.*

We have drawn freely on facts acquired from satisfied users in compiling our book. You will find it a practical guide, including instructions and specifications for installing PC Foamglas on various types of roofs. Fill in and mail the coupon.

You incur no obligation. Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pa.

· *Also makers of PC Glass Blocks* ·



THIS BOOK TELLS YOU . . . Eight points to check in selecting roof insulation . . . How to select the right thickness of Foamglas for eight types of roofs, for a full range of temperatures and humidities . . . How to install Foamglas, from preparation of roof deck to finished roofing.

MAIL COUPON TODAY

Pittsburgh Corning Corporation
Room 119, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send me your booklet entitled, "PC Foamglas Insulation for Roofs." I incur no obligation.

*Name*_____

*Address*_____

*City*_____ *State*_____

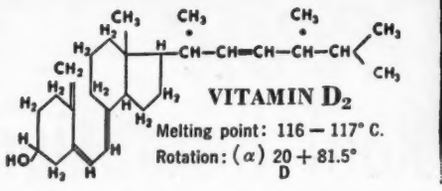
PC FOAMGLAS *Waterproof Fireproof* **INSULATION**

T. M. REG. U. S. PAT. OFF.

Winthrop ANNOUNCES New Low Prices on—

PURE CRYSTALLINE Vitamin D_2

★ (CALCIFEROL)



VITAMIN D_2

Melting point: 116 — 117° C.

Rotation: $(\alpha)\ {}^{20}_{D} + 81.5°$

Write For Details and New Price Schedule

Winthrop's synthetic vitamin D_2 (Calciferol) is free from lumisterol, toxisterol, suprasterol, and other by-products of irradiation. It never varies in antirachitic potency.

OTHER WINTHROP PURE SYNTHETIC VITAMINS:

- **TRIDEE**—Winthrop's Brand of vitamin D_3 in Corn Oil
- **VITAMIN B_1** (Thiamine Hydrochloride)
- **VITAMIN B_2** (Riboflavin)
- **NIACINAMIDE**
- **VITAMIN B_6** (Pyridoxine Hydrochloride)
- **CALCIUM PANTOTHENATE**
- **VITAMIN C** (Ascorbic Acid)
- **d-ISO-ASCORBIC ACID . . .**
- **AMINO-ACIDS**

Valine	Glutamic Acid
Cystine	Tryptophane
Tyrosine	Phenylalanine
Leucine	Methionine

- **"B-E-T-S"**—Winthrop's Brand of Bread-Enrichment Tablets
- **"VEXTRAM"**—Winthrop's Brand of Flour-Enrichment Mixture

POTENCIES AND PACKINGS:

Crystalline Form in vials of one, five, and ten grams.

Solution in Corn Oil: 1,000,000 U.S.P. Units per gram* packed as follows:

400 Standard Units	2,500 Standard Units
1,000 Standard Units	50,000 Standard Units

Also Solution in Corn Oil: 400,000 U.S.P. Units per gram packed as follows:

250 Standard Units	1,000 Standard Units
500 Standard Units	20,000 Standard Units

*Standard Unit=1,000,000 U. S. P. Units

WINTHROP

For prices and information address
Special Markets Division
WINTHROP CHEMICAL COMPANY, INC.
170 Varick Street, New York 13, N. Y.

★ Sole Manufacturer under U.S. Patent 1,902,785 granted to Winthrop Chemical Company, Inc.

in-movement of meat for which there are only 200,000,000 cu. ft. available. There is a possibility that this space will be enough to carry the load during the period immediately ahead when the normal trend in occupancy is down. But in May and June the occupancy curve turns sharply up. Real trouble will come after that time when processors of frozen fruit vegetables and other food items may not be able to find space for their products.

Can Makers Pinched by Strikes and Shortages

FOOD CONTAINERS are giving more trouble today than at any time since the beginning of the war. Strikes and shortages of labor and materials have caused a condition which has officials of both industry and government lying awake nights.

The steel strike was a body blow that cost four weeks' production of tin plate amounting to about 450,000 tons at a time when it would be felt most. In spite of the modified controls imposed by CPA on the use of tin mill products, the pinch is being felt on the last of the citrus pack and threatens to halt the canning of pineapple in Hawaii, midway through the season.

There is no time to regain the lost ground. Cans for the Alaska salmon pack must be made available for the middle of May. Pilchards, cherries and apricots must also be cared for before any of the Big Four (peas, beans, corn and tomatoes) are ready.

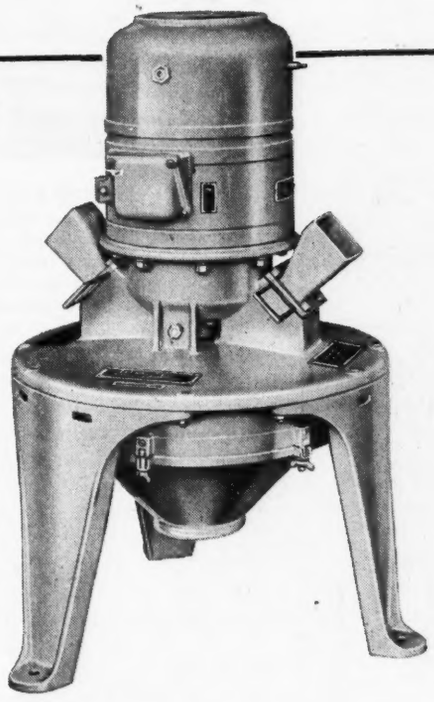
The recent revision of the tin can order M-81 is designed to handle the situation as automatically as possible. Another CPA order has permitted the steel mills to set aside 15 percent of their tin mill production for uses other than for containers for seasonal and perishable food products. This provides for general industry when normal operations are resumed. Metal for closures and crowns also must come out of the 15 percent set aside.

The revised can order includes *all* users of cans and establishes a preference schedule to guide the can manufacturers, by dividing all products to be packed into three priority groups—A, B, and C. Perishable and seasonal foods fall into group A, which must be supplied first. Anything above the requirements of the A products may be made available to B and C products. To give C products a break, the quantity of cans that may be ordered for any B item is limited to 10 percent of the yearly quota per month.

The revised order M-81 also estab-

PACK YOUR PRODUCTS FREE OF INSECT LIFE

"ENTOLETER" SYSTEM GIVES CONTINUOUS BUG CONTROL *plus!*



1

KILLS ALL INSECT LIFE

Now, more than ever, your plant and products need the "ENTOLETER" system of continuous insect control. It helps you to avoid waste of scarce food materials . . . to protect 80% flour . . . to insure the high standards of your products.

2

ESSENTIAL IN FRAGMENT CONTROL

The "ENTOLETER" system is being used successfully to reduce fragment count. Send for copy of our latest bulletin describing methods of application.

3

AIDS PRODUCT UNIFORMITY

Food plants and flour mills have found that the "ENTOLETER" system offers an excellent means of blending flours, mixing ingredients in compounds and improving vitamin distribution. This, alone, more than justifies its low cost.

ENTOLETER
INFESTATION DESTROYER

CONTINUOUS INSECT CONTROL SYSTEM

ENTOLETER DIVISION
The Safety Car Heating and Lighting Co., Inc.
P.O. Box 904, New Haven 4, Conn.

Send full information on "ENTOLETER" Continuous Insect Control System.

Name.....

Company.....

Address .....

City, Zone and State .....

NATIONAL AIROIL BURNERS

TYPE SA

Cross Section of Type SA Oil Burner

FOR POWER, PROCESS AND HEATING IN THE FOOD INDUSTRIES . . .

for FUEL OIL . . . for GAS

Burns the very lowest and cheapest grades of fuel oil or tar . . . requiring low oil pressure and low oil temperature

Firing furnaces and food processing equipment successfully . . . securing maximum heat or power from the cheapest grades of fuel is the achievement of this steam or compressed air atomizing oil burner.

Economical and trouble-free, the National Airoil Type SA Oil Burner atomizes completely and burns efficiently the very lowest grades of fuel oil or tar, requiring low oil pressure and low oil temperature. Either gravity or pressure feed may be employed.

Steam consumption is small, the burner requires only minimum maintenance and can be operated continuously without clogging or interruptions for cleaning.

For nearly 35 years we have been designers and manufacturers of fuel oil and gas burner equipment . . . let us apply this experience to the solution of your combustion problems.

Our general bulletin #745 contains photographs and descriptions of the Type SA and other National Airoil Burner installations.
Send for it . . . on your letterhead, please.

NATIONAL AIROIL BURNER Company, Incorporated
1272 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PENNA.
Texas office: 2nd National Bank Bldg., Houston

OIL BURNERS • GAS BURNERS • GAS PILOTS • PUMP SETS • EXPLOSION DOORS
ACCESS DOORS • AIR DOORS • BURNER BLOCKS • FURNACE OBSERVATION WINDOWS

Vi-Co

NATURAL "B" COMPLEX YEAST VITAMIN PRODUCTS AND YEAST DERIVATIVES

Plasmolyzed Yeast Extracts for FOOD and AMINO ACID PREPARATIONS

Vi-Co Plasmolyzed Yeast Extracts are prepared by enzyme digestion of brewers' yeast to yield a B complex product rich in essential amino acids. Amino acids provide the necessary "building blocks" for healthier and stronger bodies.

These products possess a definite "meat-like" flavor useful in enriching soups, bouillon cubes, tomato juice and other packaged foods. Such enriched foods are also of value for their natural B complex and high amino acid composition.

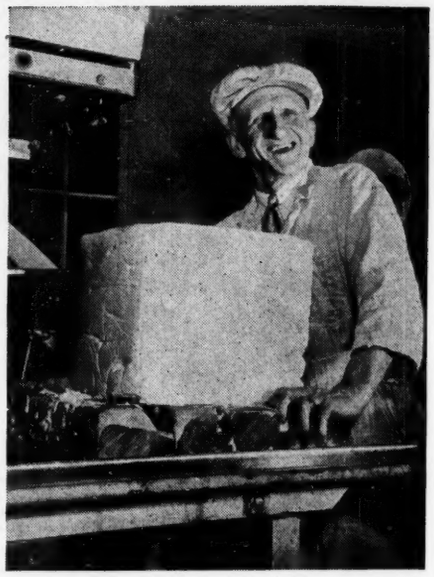
Consult us about your vitamin or yeast problems. Our technical staff can best advise you how Vi-Co products can be used to enrich your own products.

VICO PRODUCTS CO.
415 W. Scott St. • Chicago 10, Illinois

DO YOU ENJOY THESE "PLUSES"?

Not only do we get for grocery or household products, a complete, profitable nationwide distribution but we see that they receive regular, systematic sampling and demonstration on a basis that insures their future. Point-of-sale merchandising and display executed faithfully, regularly, by more than 300 trained sales specialists. And — mark this!—it doesn't cost the manufacturer a dollar! If you would like to know more about this unique national sales service write:

UNIVERSAL SALES SERVICE ASSOCIATES
120 East 41st St., New York 17, N.Y.



BUTTER PAT
A 63-lb. square of butter used to be nothing special in the country's milk plants, but with the present high price ceilings for fluid milk against the relatively low ceiling for butter, there is no profit in butter-making. Hence the rarity of this photo.

lishes new packing quotas for products classified either B or C. The A group has an unlimited quota.

For practical purposes, tin cans will not be available for the B group until late summer or early fall and C items can scarcely be cared for before the turn of the year. It will take that long for the tin mills to catch up, even at capacity operation.

There seems to be no solution for those who are caught in the squeeze. Glass containers are tight, too. The glass manufacturers, if not troubled by strikes, labor shortages or shortages of raw materials, are in a price squeeze and have shifted their operations to more profitable lines. Dairies that need bottles need not look to paper containers as a way out. Both paper and paraffin are scarce.

The situation in wooden containers is well known. Labor is not available at any stage of production from the woods to the finished product, whether loose or tight cooperage or boxes.

The only bright spot, if it can be called that, is in the supply of steel drums. They will be available in necessary quantities but only at the expense of nonfood uses.

New Packaging Laboratory

D. REID WHEEDON, JR., recently in charge of packaging specifications for U. S. Navy, and Thomas H. Rhoades, formerly in charge of Packaging Division, Central Laboratories, General Foods Corp., have formed a consulting service known

Tells How to Get *Fast Steam* Most Efficiently at Lowest Cost

GET YOUR COPY JUST OFF THE PRESS!
Automatic STEAM GENERATING U
For Light and Heavy Oil Operation
Starts
with the Flick of a Switch
Fully Automatic "Packaged" Steam Generating Plants
ORR & SEMBOWER, Inc
READING PENNSYLVANIA U.S.A.

THE NEW POWERMASTERS—completely described in this 8-page bulletin—are fully automatic, "packaged" oil-burning steam generators completely assembled with boiler—oil burner—condensate return system—automatic control system—in one compact unit.

FAST LOW-COST STEAMING is one of the Powermaster's outstanding features. Flick the switch and you have full steam pressure in as little as 18 minutes. No delays. No stoking. No constant attention to values, gauges and controls.

CLEAN OPERATION. Piped-in fuel eliminates dust, soot and ashes. Your boiler room can be kept almost as spotless as your office—a point of particular value to *you*.

SPACE-SAVING. The Powermaster generates steam equal to ordinary boilers needing twice as much floor space. Moreover—no stack is needed for draft. A small vent pipe carries off combustion gases.

QUICKLY INSTALLED. Delivered in one unit—mounted on structural steel base—and installed in a few hours, with practically no interruption to your plant operation.

ONE-COMPANY RESPONSIBILITY. Designed for your steam requirements by O & S engineers, tested to A. S. M. E. standards and shipped complete from O & S . . . you place full responsibility for dependable steam with one reliable company, established 60 years.

ORR & SEMBOWER INC.

READING, PENNSYLVANIA

District Offices: BOSTON-CHICAGO-CLEVELAND-NEW YORK-PHILADELPHIA-SEATTLE

IF YOU WANT TO SEE—

the latest types of automatic steam generating units—and learn how to save fuel with faster steaming—send for new Bulletin #1214. Write on your letterhead—or just clip, fill in and mail this coupon.

ORR & SEMBOWER, INC.
812 MORGANTOWN ROAD
READING, PENNSYLVANIA

Please mail the new 8-page O & S Powermaster Bulletin #1214 to:

COMPANY_____

ADDRESS_____

CITY_____ **ZONE #**____ **STATE**_____

ATTENTION OF_____

"AFTER 14 YEARS OF SERVICE OUR *Baker Truck* NEEDS NO NEW PARTS!"

"Your letter of December 29 was received with relation to our Baker Truck. Our superintendent tells us that surprising as it may seem, no new parts are necessary. Your representative told him what adjustments could be made, and it seems that they could do it all right there at the cannery. It looks like this is just one more blue ribbon for the Baker Truck, because it is amazing that after all these years of service a general replacement of essential parts is unnecessary. It is certainly very gratifying to us."

—And gratifying to us, too! Letters like the above, from a food processing plant, prove two things: first, that the sturdy construction and high standards of Baker engineering design mean dependable service and long life; second, that proper industrial truck care pays the user big dividends in continuous operation and low maintenance.

The truck in question was purchased in 1931. The original investment has long since been written off—paid for in a short time by actual savings in handling costs and more efficient use of warehouse space. The owner has enjoyed 14 years of trouble-free service—possible only with electric trucks, which also mean quiet, smooth operation, lowest power costs and maximum safety.

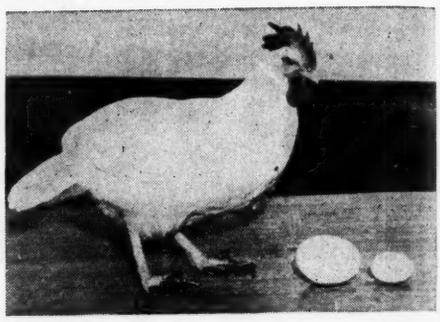
• • •

Your Baker representative can show you how these advantages of electric-powered industrial trucks will apply to your handling problems. If you don't already know him, write us direct.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2146 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Limited

EITA
Member: Electric Industrial Truck Association

Baker INDUSTRIAL TRUCKS



POWER PROJECT
If there is an egg shortage it won't be the fault of this Los Angeles hen, whose heavy production is shown here alongside a normal egg. The big one weighs 8 ounces against the average 2 to 2¼ ounces.

as Package Materials Laboratories, Inc., 12-33 Broadway, Long Island City, N. Y. In addition to consulting on protective packaging, the firm will sell controlled atmosphere cabinets for package testing.

USDA Offers Program For Dairy Industry

T. G. STITTS, director of the dairy branch, USDA, made the following recommendations to the Special Committee to Investigate Food Shortages in Washington recently:

1. Stimulate milk production by planting larger acreages to corn, soybeans and related crops, greater fertilization of pasture and hay crops and planting more legume hays, and by diverting feed to milk production and encouraging more rapid marketing of hogs, cattle and poultry.

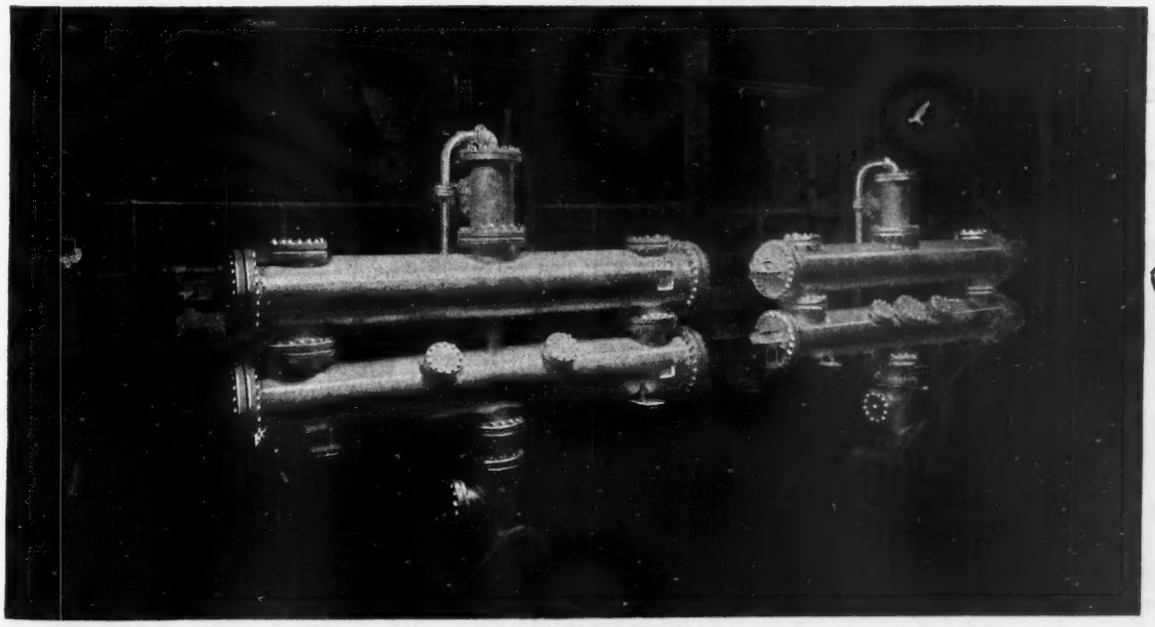
2. Channelize milk and butterfat by small price adjustments upward and imposition of limitation orders, similar to those employed during the war, but only in extreme emergencies when price adjustments do not bring about desired results. Specifically, Mr. Stitts suggested permitting the reduction of butterfat in ice cream without requiring a reduction in price, issuance of a regulation designed to eliminate the custom churning of butter, and permitting butterfat content of fluid milk to be reduced without price reductions.

3. Equalize returns to dairy farmers by raising the price of butter or paying a subsidy on butter manufactured, raising price of all dairy products relative to other farm products, or announce now that there will be a higher price for milk and milk products on July 1.

4. Promote efficiency of milk production and disposition through combined efforts of health authorities, producer cooperatives and milk dealers to expand local milksheds to meet the larger requirements of their markets.

FOR A PILOT PLANT OR A PRODUCTION INSTALLATION

"This will be a continuous digester, which we call a Defibrator-Chemipulper"
"The two chambers are each 18" OD x 18'-0" long, made of 1/8" thick 20% stainless clad steel plate, through which rotates a stainless steel helical screw conveyor"
"The unit must meet the requirements of the A.S.M.E. Code for Unfired Pressure Vessels for a steam working pressure of 150 psi"



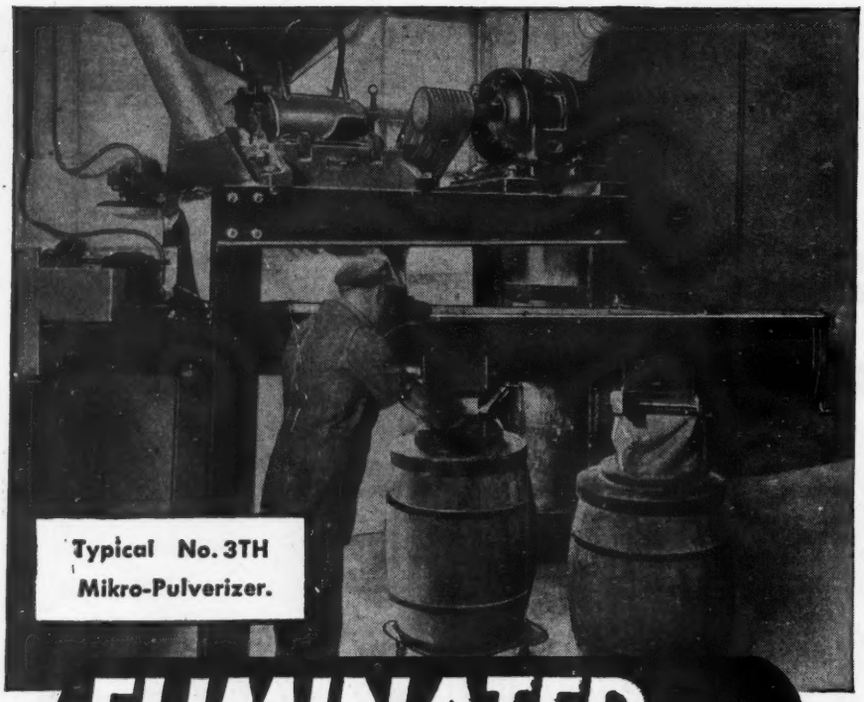
COURTESY OF PAPER AND INDUSTRIAL APPLIANCES, INC. NEW YORK CITY

"THE FINISHED DEFIBRATOR-CHEMIPULPER—THAT'S WHAT I CALL A SWEET JOB."

ALLOY FABRICATORS

DIVISION OF THE ROBINSON FOUNDATION, INC.

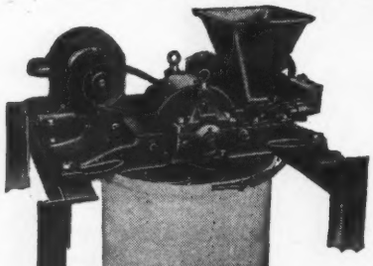
PERTH AMBOY • NEW JERSEY



ELIMINATED—
...2 classifying screens
2 mills
7 motors
and conveyors

THIS impressive list of equipment was replaced in the plant of one manufacturer with the installation of a MIKRO-PULVERIZER. In addition, cleaning time was reduced from 6 hours down to 30 minutes.

Such savings among MIKRO users are not unusual. These and similar advantages all stem from a design especially suited and guaranteed for each individual application—from a report and recommendation made only after careful test and check of the user's material in our laboratory and test grinding department—the services of which are available without cost or obligation.



NO. 2TH MIKRO-PULVERIZER

Submitting a production test sample of your material for test grinding may provide the answer you are seeking. Write today for your copy of our Confidential Test Grinding Data Sheet.

PULVERIZING MACHINERY COMPANY

97 CHATHAM ROAD • SUMMIT, N. J.

NOW...2 TYPES TO MEET MOST PULVERIZING NEEDS

MIKRO-PULVERIZER (FINE)
-ATOMIZER (ULTRA FINE)

Reg. U. S. Pat. Off.

PROCESSING

Frozen Food Packers Form Midwest Council

SIX frozen food packers in the Midwest have recently incorporated, under the laws of the State of Michigan, the Midwest Frozen Foods Council, Inc., with offices at Benton Harbor, Mich. Their purpose is to promote improved methods of quality control in the processing of frozen fruits and vegetables and to conduct research in the science and technic of fruit and vegetable processing in cooperation with various government and other research agencies.

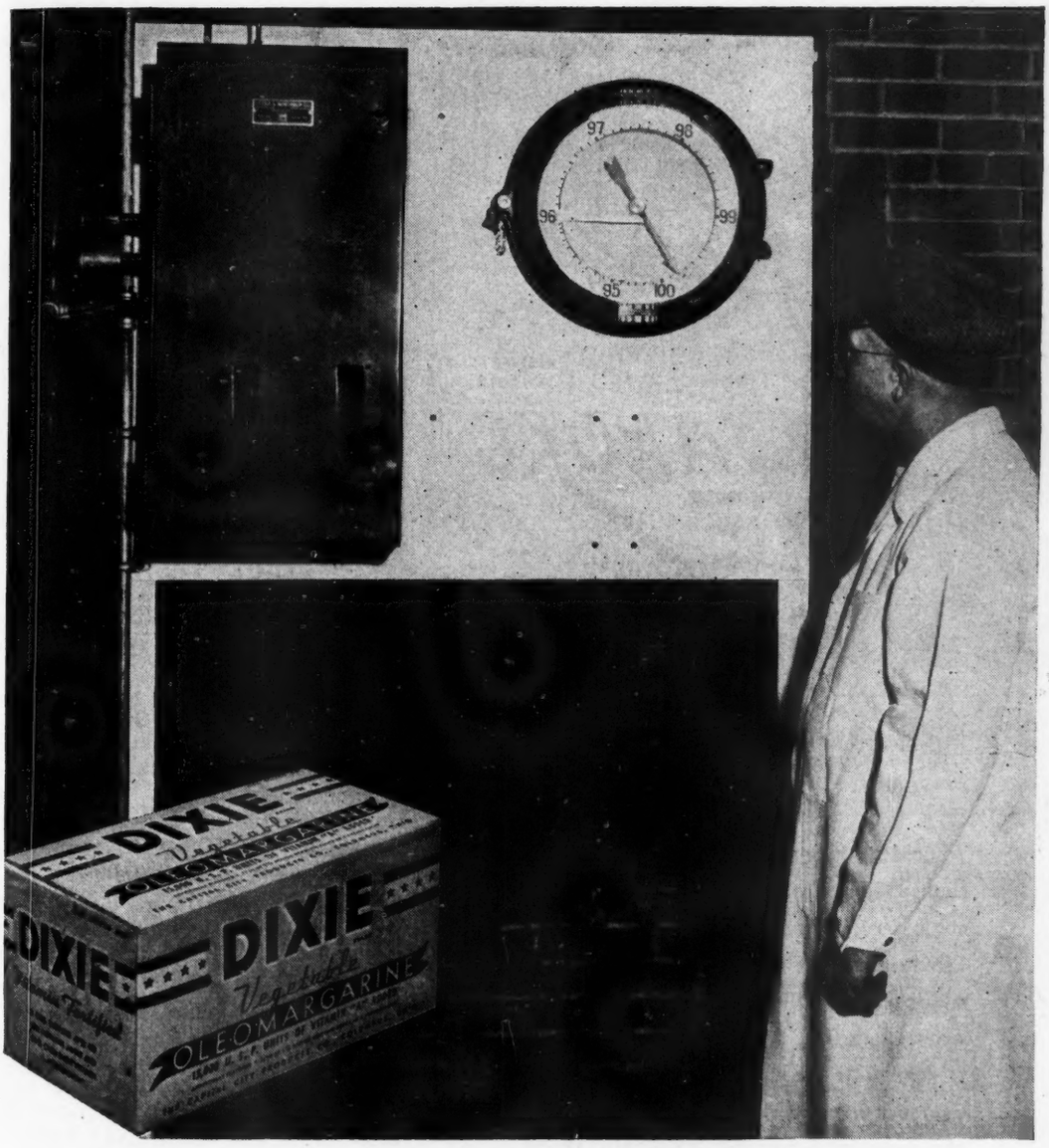
The new organization is establishing a quality control and research laboratory at Benton Harbor in cooperation with Superior Laboratories of Indianapolis. Claude S. Abshier, formerly with Standard Brands, Inc., is the director. Officers and incorporators of the new organization are: President, F. L. Granger, Producers Service Corporation; vice-president, Charles A. Elder, Fruit Processors, Inc.; secretary, C. H. Carlson, Burnette Packing Co.; treasurer, Carl Steimle, Sodus Fruit Exchange; directors, C. N. Hinman, Farm Bureau Fruit Products, and Oscar Wade, House of David preserve department.

Big 5 Wage Increases Guide Other Packers

THE 16-cent hourly wage increase instituted by the government in the seized plants of the five major meat packers has been established as the "pre-approved" pattern for other meat packers and may be a guide to increases in related industries. The five were Armour & Co., Cudahy Packing Co., John H. Morrell & Co., Swift & Co., and Wilson & Co.

Other packers whose plants were not under seizure were given permission to institute the same increase, if their wages normally have been adjusted in relation to the "Big Five," and they may obtain price relief from OPA without obtaining approval from the National Wage Stabilization Board. In plants remaining under government control, the increase must be ordered by NWSB on request of the Department of Agriculture or the union.

It was learned from the USDA in mid-March that plants were being turned back to the owners as soon as agreements containing a wage increase were reached with the union. OPA has approved price increases averaging 50 cents per 100 lb. to



Capital City Products Co. operator notes from Micromax gas-analysis record that, at the moment, hydrogen is 99.8% pure.

MICROMAX Safeguards Manufacture of Margarine By Checking Purity of Hydrogenating Gas

Close attention to hydrogen purity is no mere incidental detail with the Capital City Products Co., Columbus, Ohio, when hydrogenating vegetable fats and oils to make Dixie Margarine and other products. They must, to protect both plant and product, make sure that the hydrogen used is practically oxygen free.

Giving the assurance that's needed, a Micromax Recorder not only tells the gas-analysis story accurately and at a glance, but sounds an alarm should hydrogen purity fall below standard. Action is fully automatic, with only a minimum of day-by-day attention required.

Micromax Recorders for gas-analysis (available either in the round-chart model shown above, or in a strip-chart model) operate on the fundamentally sound thermal-conductivity principle. They employ gas-analysis cells whose gas-exposed surfaces are all glass, thus corrosion-proof. These and other factors contribute to the low maintenance and constant sensitivity characteristic of the instrument.

Write us describing your gas-analysis problem. An L&N engineer will be glad to send helpful data.

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA. 44, PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

Jrl Ad N-91-704(1)

To cold storage your perishable foods... choose Roanoke. More than 1,000,000 cubic feet of cooler and freezer space. Private siding on N & W main line and adjacent to the Virginian and C & O. Ideal arterial roads. For financial protection ... careful handling ... rapid distribution ... "stick a pin in Roanoke". A natural by the map. Icing facilities available. Write for illustrated folder.

Roanoke Ice & Cold Storage

ROANOKE, VIRGINIA

Wide World

NOT A GRAPEFRUIT

The young lady is holding the 3½-lb. orange that took the prize at the Florida orange festival, held recently at Winter Haven, Fla. California papers may copy.

compensate for the higher wages.

Seizure of 200 units of 13 companies ended strikes in January, and a government panel's recommendation for a 16-cent increase was approved by NWSB at the request of Secretary Clinton P. Anderson.

Wage increase patterns have not been established in other food industries, but if a relationship to the meat packing industry can be claimed, NWSB is likely to approve any increase up to 16 cents over the V-J rates. Approval can also be obtained on the basis of bringing wage rates up to 33 percent above the rates prevailing in January, 1941.

Until a general pattern is determined for an industry, approval must be obtained from NWSB before an employer can seek price relief.

President Truman's executive order of February 14, stating that employers would be waiving all rights for price relief if they instituted a wage increase, has been changed. Now an employer may pay a wage increase and not waive his rights later for seeking approval of the wage increase and for price relief, if he files within 30 days a notice that he has "no intention" of seeking price relief. Then, if experience of a month or two should show that his estimates were wrong and that he is losing money he may still ask for higher ceiling prices.

Brazil Freezer Plant

THE Brazilian government has approved plans for the installation of a $250,000 freezing plant at the Rio de Janeiro Federal Fish Market

5 Outstanding Packaging Developments

BY PALMER

SIFTPROOF CARTONS . . .

More acceptable to the consumer, Palmer siftproof cartons provide *added* protection and strength. Absolutely siftproof and constructed with board-saving simplicity, they are easily filled on high speed Palmer machines soon available—fully or semi-automatic. One-piece ends, recessed or flush, are permanently sealed into the side walls; body can be made with any type of side seam, including "tear-away" opening flap on any panel. Same construction is well suited to many liquid and semi-liquid products.

PAPER MILK CONTAINERS . . .

Built to stand more punishment and give more protection against leakage than most other containers, this Palmer product offers many indispensable features. All seams and flaps are sealed thermoplastically for liquid-tightness. The convenient dispenser, designed for both drinking and pouring, is completely shielded until the container is opened by the consumer, thus meeting sanitary requirements. The flat top and bottom permit easy stacking in the refrigerator or in cases. Flat cartons may be formed, waxed, filled and sealed in the dairy plant on Palmer machinery soon available; also, preformed cartons will be available for subsequent operations in the dairy.

ICE CREAM PACKAGES . . .

These sealed, leakproof cartons contain less board material, have features more appealing to the consumer, both as dispensers and storage containers. Formed, filled and sealed entirely by machinery, Palmer liquid-tight packages save labor and time in the ice cream plant. The automatic machinery (soon available) operates in conjunction with the freezing unit at equivalent speed.

FROZEN FOOD CONTAINERS . . .

Tightly constructed Palmer cartons with heat-sealed liners have been formed by Palmer machinery in frosted food plants for several years. The interiors, wholly sealed against the transmission of air and moisture, have proved their moistureproof qualities under most exacting conditions of use. Also available now is Palmer machinery for forming and closing cellophane-lined locking style containers, and for forming and closing sealed recessed end containers.

SIFTPROOF PAPER BAGS . . .

Packaging with thermoplastically sealed, flexible containers provides operating advantages, including economy in time and savings in materials and in labor. The tight-sealing process requires only heat and contact. Made and filled at speeds up to 100 per minute, Palmer siftproof multi- or single-wall bags are constructed in a variety of sizes, with or without pouring features. Palmer machinery for making and filling these bags is available.

PALMER
CHICAGO

Kindly address all inquiries to . . . . . FRANK D. PALMER, INC

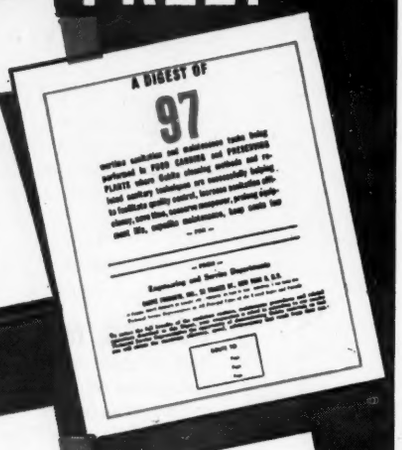
528-34 NORTH WESTERN AVE., CHICAGO 12, ILLINOIS

DESIGNERS AND BUILDERS OF SPECIAL MACHINERY

3 OAKITE GUIDES to LOW-COST Sanitation FREE!

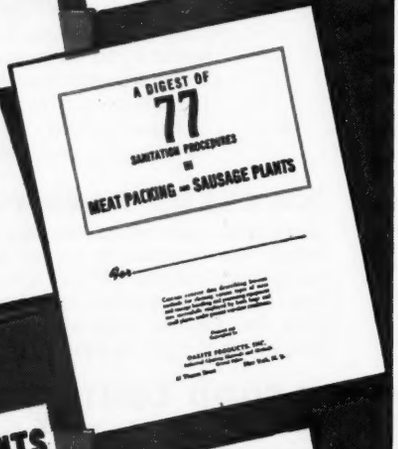
1. FOOD CANNING DIGEST

Successful Oakite answers to more effective cleaning of kettles, peelers, retort baskets, conveyor belts, spiral cooking coils and other equipment are contained in this 24-page sanitation guide. Digest also gives detailed data on low-cost scale and rust removal from water circulating and steam-jacketed units.



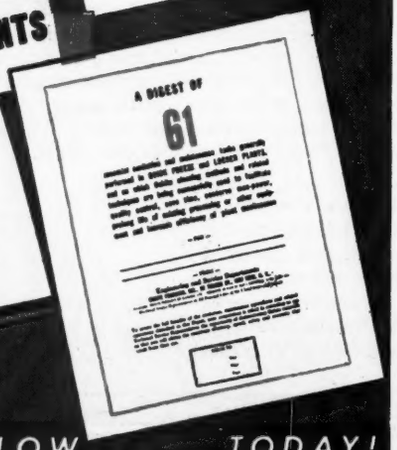
2. MEAT PACKERS DIGEST

Describes low-cost Oakite methods and materials to help speed-up and simplify the handling of your daily clean-up work in all departments. Over 58 various commonly recurring sanitation and maintenance tasks are discussed. Take full advantage of these time and money saving suggestions by sending for your free copy today!



3. QUICK FREEZE & LOCKER PLANTS

This Oakite Sanitation Digest, expressly prepared for operators of quick freeze, dehydrating and locker plants, gives many valuable, time-saving tips on daily clean-up of processing and handling equipment. A special section is devoted to safeguarding product quality through germicidal treatment of equipment surfaces.



FILL OUT COUPON BELOW . . . TODAY!

Check and mail for whichever of these FREE helpful Oakite Digests you would like to have.

1. Food Canning ☐
2. Meat Packing ☐
3. Quick Freeze & Locker Plants ☐

OAKITE PRODUCTS, INC.
26G Thames Street, New York 6, N. Y.

Name .....
Company ...
Address .....
City ..... State .....

OAKITE Speedy Low-Cost CLEANING
MATERIALS . . . METHODS . . . SERVICE FOR EVERY CLEANING REQUIREMENT

(Entreposto Federal de Pesca de Rio de Janeiro). Twenty freezing chambers and equipment for the production of 96 tons of ice per day will be purchased, possibly from the United States, according to a report of the American Chamber of Commerce for Brazil.

New Flour Discussed By New York Bakers

BAKING with the 80 percent extraction flour should offer little trouble, if the flour is good, Dr. Oscar Skovohlt, director of Quality Bakers of America laboratories, told the March meeting of the Metropolitan Production Men's Club, in New York.

Dr. Skovohlt said there would be quicker "pick up" in high speed mixing and that the mixing would range from 20 to 40 percent less. It will be sticky and runny during fermentation, he said, and that is the point on which production men will have to adjust their sights. Fermentation will be rather less than more, contrary to the popular conception.

No formula change was recommended by the speaker, other than possible adjustment of yeast food, particularly with southwestern flours Malt needs watching, if highly diastatic, otherwise not.

Preservers to Confer With Food Inspector

A SANITATION committee of the New York Preservers Association has initiated a conference with A. E. Abrahamson, chief of the New York City food inspection department, with a view toward framing a sanitary code for preserve plants in the area. It is felt that such a code, once adopted by the New York preservers, will in time assume national significance and be adopted by the entire industry.

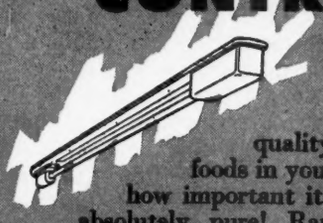
Some of the topics, suggested for discussion by Joseph A. Raphael, president of the association, include the type of equipment best fitted to the industry, cleaning and maintenance of equipment, sanitary handling of fresh and frozen fruit, control of rodent and insect infestation, waste disposal, and personal habits of plant employees.

Fats and Oils Quota Ended April 1 by USDA

THE emergency quota of four percent on fats and oils for manufacture of shortening, salad and cooking oils, which has been effective under WFO 42 since October 1, 1945, was discontinued as of April 1, by USDA in order to help meet the President's

PROTECT YOUR PRODUCTS' purity

WITH STERILAMP* CONDITIONING'S CONTROLLED AIR-SANITATION



Are you responsible for quality-control of perishable foods in your plant? Then you know how important it is that the air be kept absolutely pure! Rancidity, off-flavors and product deterioration are often traceable to the airborne bacteria and mold which swarm unseen and untouched in unprotected plants.

To prevent spoilage and contamination caused by these invisible menaces to profits, install STERILAMP CONDITIONING. This Westinghouse engineered application of ultra-violet radiation sanitizes the air around products, processing equipment and packaging. It provides a sterile environment for products—keeps your goods free from airborne contamination; supplies controlled air-sanitation exactly where and when it is needed. Its rays *kill* bacteria, both in the air and on irradiated surfaces!

With STERILAMP CONDITIONING you get a definite and positive control of airborne mold spores throughout the entire plant. Trained experts prepare for you without charge a "custom tailored" air-sanitation plan to cover plant-wide requirements or strong local radiation in specified areas as called for by your particular processing problems.

Investigate modern, economical STERILAMP CONDITIONING now! Just sign and send in the coupon below—our trained representative will call and give you free engineering advice, with no obligation to you. Mail it today! STERILAMP Division, Westinghouse Electric Corporation, Bloomfield, New Jersey.

*Reg. U. S. Pat. Off.
Copyright, 1946, Westinghouse Electric Corporation

Mail This Coupon For Details on Free Engineering Advice!

STERILAMP DIVISION
Westinghouse Electric Corporation
Bloomfield, New Jersey

Send me more information on STERILAMP CONDITIONING. Without obligation, have your representative call to give me free engineering advice on STERILAMP CONDITIONING.

Name.....

Street.....

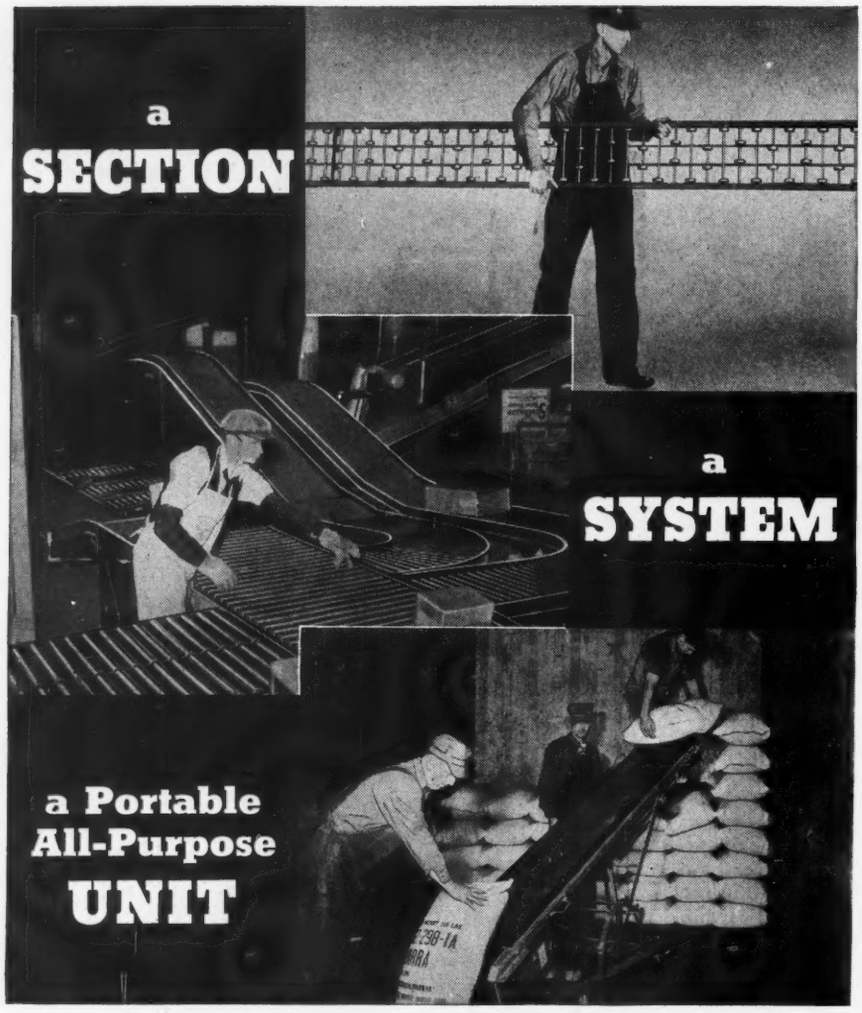
City.....State.....

FI-2

IF IT'S A STERILAMP IT'S

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE



Standard can give you any one or all three . .

BECAUSE Standard builds power and gravity conveyors in light—average—or heavy duty types for either stationary or portable use, as well as a wide range of special types, you can install Standard equipment as you need it.

For "spot" handling of packages at receiving or shipping departments a section of wheel or roller conveyor will save time and eliminate excess manual handling. For stacking and piling merchandise in warehouse or storage rooms a Standard Handibelt or Handipiler portable conveyor will speed the work and utilize hard-to-get-at ceiling space. For complete "linking" of all operations from receiving through manufacturing to shipping a system of Standard power or gravity conveyors (in belt, roller, slat, push-bar, or chain types) cuts handling time, manpower, and costs to the minimum.

Whatever you need—whatever your plans in conveying equipment check with Standard and gain the benefit of a 40 year background in conveying and conveyors.

Write for useful reference book "Conveyors by Standard" Catalog No. FI-46

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities

ROLLER - BELT - SLAT - PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

program calling for the export, during 1946, of 375,000 tons of fats and oils for critical food needs abroad.

The expected yield of oil from the four principal vegetable oils (cotton, peanut, corn and soybean) from 1945 crops shows some decline from the original estimates. The decrease is due principally to lower December estimates of the cotton and peanut crops and less than expected processing of corn and peanuts for oil. This shrinkage has broadened the spread between supplies available and essential needs that must be met.

RAW MATERIALS

No Action This Year On Alaska Trap Sites

OSCAR L. CHAPMAN, Acting Secretary of the Interior, stated recently that no action will be taken, at this time, either to impose an upper limit on salmon trap-site holdings in Alaska or to establish a general system of preferences with respect to occupancy of trap sites. With the announcement, he made public a notice of amendments to the Alaska Fishing Regulations for 1946.

Secretary Chapman said that since preparations for the Alaska salmon season, which will begin in some districts in May, are already under way and a heavy preseason investment already has been made by last season's occupants of trap sites, it appears unlikely, if sites were to be thrown open to competition by imposition of a 20-trap limitation, that they could be supplied with traps and effectively occupied by newcomers in 1946.

Plan Increased Facilities For West Coast Fishermen

A PLAN for enlargement and development of Seattle harbor, to accommodate commercial fishing vessels of the area, whose needs are steadily increasing, was considered recently by Seattle District, U. S. Army Engineers, at a hearing attended by many business and shipping men from the Puget Sound area.

Recognizing that Seattle's huge fishing fleet has for some time been cramped for moorage facilities, and that traffic through the federal locks, which link the Sound with Lakes Union and Washington, has become so congested that construction of additional locks is becoming a "dire necessity," spokesmen recommending the project urged the engineers to build a $2,000,000 addition to existing harbor developments.

TODAY'S *Merchandising Trends*

1. *self-service*
2. *convenience*
3. *brand emphasis*
4. *protection*
5. *informative labeling*

* *Based on authoritative surveys of both consumer and retailer preferences.*

your package must *sell* your name!

Instant, easy recognition of your BRAND through distinctive dynamic packaging is a sure way to bigger sales.

This emphasis of your BRAND in a good package design is the result of careful creation by expert artists—a deliberate ingredient in the overall engineering of a package designed to stimulate consumer attention. Highlighting the Brand Name is one of many reasons why *Packages By Milprint* means packages that sell themselves!

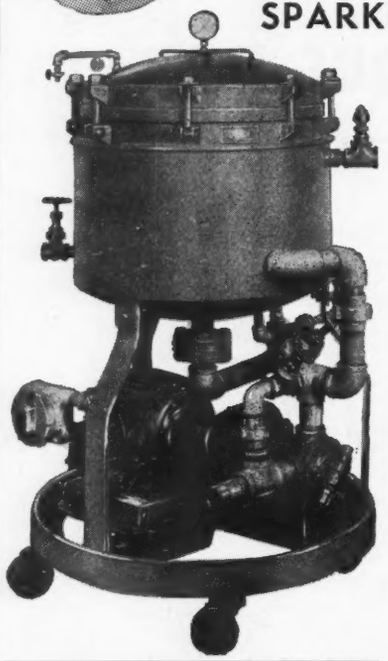
Printed Cellophane, Pliofilm, Glassine, Aluminum Foil, Cellulose Acetate, Vinyl, Lacquer coated and Laminated Papers in all forms, including Sheet Wraps, Rolls, Pouches, or Specialty Bags, Revelation Bread Wraps, Specialty Folding and Window Cartons, Counter Displays, Simplex Pie and Cake Units.

Sales Offices at New York • Chicago
Boston • San Francisco • Philadelphia
Grand Rapids • Los Angeles • Cleveland
Dallas • Minneapolis • Cincinnati • Atlanta
Pittsburgh • St. Louis • Indianapolis
Kansas City • Memphis • Rochester

MILPRINT Inc.
PACKAGING CONVERTERS • PRINTERS • LITHOGRAPHERS
plants at Milwaukee, Philadelphia, Los Angeles, Tucson and San Francisco

PACKAGING HEADQUARTERS TO AMERICAN INDUSTRY

Here are 7 ADVANTAGES
of Filtering Food Liquids with "Horizontal Plate" SPARKLER PRESSURE FILTERS



1) RAPID FLOW RATES—Uniform cake; ample freeboard for run-off filtrate.
2) LONG CYCLES—Cake stability, even during intermittent operation.
3) HIGH QUALITY FILTRATE—Uniform density of cake.
4) EASY CLEANING—No cloths to wash.
5) COMPLETE BATCH FILTRATION—Cakes may be blown dry; no unfiltered residue.
6) LOW OPERATING COST.
7) PORTABLE — FLEXIBLE.

Let a Sparkler engineer help you with your filtration problems.

SPARKLER MFG. COMPANY
277 Lake Street MUNDELEIN, ILL.

Write for any special information

SPARKLER HORIZONTAL PLATE FILTERS

New Flour Order Hits Semolina Manufacturers

SEMOLINA and durum fancy patent flour, as it is now known to the trade, will be off the market very soon because it cannot be made under the new 80 percent wheat extraction order, according to representatives of macaroni manufacturing plants. Semolina is the purified middlings of durum wheat containing no more than 0.92 percent ash on a moisture free basis and containing no more than 3 percent flour, that will pass through a 100 mesh screen.

Not more than 55 percent of the durum wheat mix is used in producing good semolina or durum fancy patent flour. The product from the milling of 100 lb. of cleaned durum wheat normally consists of about 55 lb. of semolina or durum fancy patent flour, 17 lb. of clears and other low grade flour, used for human consumption, and 28 lb. of animal feed. Under the new requirements, all of the clears and other low grade flours and 8 lb. of the milled feed will go into the flour.

SCHEDULE OF EVENTS

APRIL

1—Packaging Machinery Manufacturers Institute, Hotel Dennis, Atlantic City.
2- 5—Packaging Exposition, American Management Association, Public Auditorium, Atlantic City.
8-12—American Chemical Society, Agricultural and Food Division, Atlantic City.
9—American Bulk Condensed Milk Association, first annual meeting. Stevens Hotel, Chicago.
9-12—Annual Safety Conference, Hotel Pennsylvania, New York, N. Y.
18-19—Wisconsin Dairy Manufacturers, conference, University of Wisconsin, Madison, Wis.
22-27—Society of the Plastics Industry, 1st national plastics exposition, Grand Central Palace, New York.
24-25—Frozen Food Locker Association, regional convention, Masonic Temple, Portland, Ore.
24-26—Industrial Packaging Engineers Association of America, exposition, Hotel Sherman, Chicago.
25-27—National Fisheries Institute, first national convention, Continental Hotel, Chicago.

MAY

6- 9—American Society of Brewing Chemists, annual meeting, Pfister Hotel, Milwaukee.
13-15—Millers National Federation, annual conference, Edgewater Beach Hotel, Chicago.
13-16—American Association of Cereal Chemists, 31st annual meeting, General Brock Hotel, Niagara Falls, Ont., Canada.
15-17—American Oil Chemists Society, 37th annual meeting, Roosevelt Hotel, New Orleans.
21-24—Society of American Bacteriologists, 46th annual meeting, Book-Cadillac Hotel, Detroit.
26-29—National Peanut Council, national convention, Cavalier Hotel, Virginia Beach, Va.

JUNE

1-30—National Dairy Month.
2- 4—Flavoring Extract Manufacturing Association of the United States, annual convention, Drake Hotel, Chicago.
24-27—National Confectioners Association, 63rd annual convention and 20th confectionery industries exposition, Stevens Hotel, Chicago.

HOW ARE YOUR NEW YORK DEPARTMENT STORE SALES?

If you have a grocery product that should be faring better in this key sales medium in this key market we want to talk to you. A specialized selling group that gets products in, moves them, and keeps moving them—and at a cost that will compare advantageously with your present sales cost, if you are not represented by a food broker. You have nothing to risk by asking us today how we do it.

MURRAY-ALLEN COMPANY
370 LEXINGTON AVE. NEW YORK 17, N. Y.
TELEPHONE MURRAY HILL 3-8983

WHY DOES THIS FAN BLOW UPWARDS?

Reco RADI-AIRE CIRCULATOR

The RECO blows upwards because by so doing it provides uniform temperature and humidity at the floor, at body level and at the ceiling—this is something the ordinary horizontally blowing fan cannot do. These desirable results contribute materially to producing a uniform product.

NO DRAFTS

The RECO operates without drafts which cause sore throats and it does not blow light materials about. It dissipates odors, smoke, steam and gas. It reduces fuel costs. Write for complete details.

REYNOLDS ELECTRIC COMPANY
Mfr. of Refrigerator Fans, Processing Room Fans, Heat Circulaters, Food Mixers, Veg. Peelers, Chopper-Slicers.
2668 W. Congress St., Chicago 12, Ill.

Why? Because makers of cream cheese want their product to stay fresh. They have found from experience that there's no material equal to aluminum foil if you want . . .

TO PRESERVE GOODNESS

You get less moisture-vapor transfer. You get protection from light. You get protection from foreign odors and tastes. You get protection from oil and grease stains. AND . . . *you get a beautiful, sparkling package.*

TO PRESERVE GOODNESS . . .

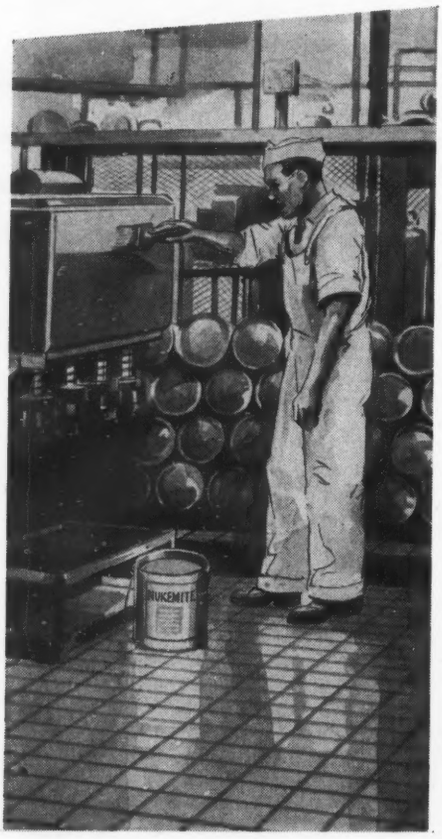
Use Alcoa Aluminum Foil in *your* package. This can be done in many different and effective ways. Consult your package supplier on the best way of giving your product this better protection . . . in a carton, bag, packet, or wrapper.

For names of package suppliers experienced in producing Alcoa Aluminum Foil packages, call the nearest Alcoa sales office, or write ALUMINUM COMPANY OF AMERICA, 1845 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA

ALCOA ALUMINUM FOIL

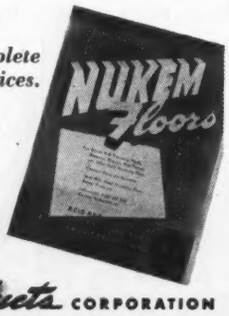
NUKEMITE Gives
Complete Protection Against
Acids, Alkalies, and Corrosives



NUKEMITE is a synthetic resin solution which is applied like paint but dries to form a flexible, impenetrable plastic film. It is extremely resistant to strong acids, alkalies, most solvents and severe outside exposure. It is odorless and tasteless and will not contaminate the product. It retains its lustre and flexibility indefinitely.

NUKEMITE can be applied by brushing, spraying or dipping. But it has no similarity to paint except in the method of application. It is available in black, white, gray and red. As a protective coating for floors, walls, piping, pumps and other equipment, subject to corrosive action, NUKEMITE has no equal.

Write for complete information and prices.



NUKEM Products CORPORATION
108 COLGATE AVENUE, BUFFALO 20, N. Y.

INDICATORS

Production

Flour production showed an increase of more than 2,000,000 sacks in February, over the output a year ago, says the Northwestern Miller. The total was 16,324,960 sacks, which compares with 14,260,324 in January, and 14,186,806 for February, 1945. These figures represent 73 percent of the U. S. total. The Census Bureau reports 269,804,000 sacks of regular grind wheat flour in 1945, an all-time record, and 14.1 percent above the previous year.

Creamery production, in January, was more than 3 percent over the December production, which was about half the average seasonal gain and about 10 percent less than the gain between the same months last year. Output was estimated at 68,995,000 lb., the lowest for the month since 1921, 30 percent under January, 1945, production, and 44 percent less than the five-year average.

Lard production dropped to 142,369,000 lb., in January, as against 172,193,000 lb., in December.

Canned fruits and vegetables, in packers' and wholesale distributors' inventories on January 1, were the lowest beginning-of-the-year stocks since before the war. The total, which includes juices and baby foods, was 166,500,000 cases, 27,400,000 cases less than a year ago, and about half the total inventoried two months before the start of the blue-point rationing in 1942.

Fish and shell fish production goals, which include their products, are substantially the same as last year, with the exception of cured fish. Because of heavy demand and the removal of wartime regulations, the goal for cured fish has been upped from 90- to 100,000,000 lb. Total production for 1945 amounted to 4,400,000,000 lb., a decline of less than 1 percent from the catch of the previous year.

Ice cream production for 1945 is estimated at 471,265,000 gal., 6 percent more than the previous year's total and the highest production on record, exceeding the previous peak, 1942, by 2 percent.

Materials

World rye production for 1945 is estimated at about 1,400,000,000 bu., a decline of about 10 percent from the previous year, and a drop of about 19 percent from the 1935-39 average. This is the lowest world output since 1921.

World wheat production, in 1945, totaling 5,200,000,000 bu., is the smallest since 1929 and 8 percent less than in 1944. While crops in North America and Asia were considerably above average, their total was smaller than the previous year. European crops, however, are estimated at 36 percent below prewar.

Percentages showing the relationship between the 1945 acreage for corn canners in various states and their intended acreage for 1946, as reported by the Corn Canners' Service Bureau, are as follows: Maine, 100; New York, 110-150; Pennsylvania, 100; Maryland, Delaware, 90-110; Ohio, 100-150; Indiana, 100; Illinois, 100-110; Iowa-Nebraska, 100; Minnesota, 95-100; Wisconsin, 80-125; Washington, 100; Idaho, 100. These figures are not final or averages by states, but express the range of intentions on reports received to date.

In Storage

Frozen fruits in cold storage, February 1, reached 361,980,000 lb., which is only slightly under the 375,773,000 lb. on hand January 1, but is considerably ahead of the 242,253,000 lb. in cold storage on February 1, 1945.

Frozen vegetables in storage, totaled 172,116,000 lb., on February 1, as compared with 191,218,000 on January 1, and 145,622,000 lb. on February 1, 1945.

Canned tomato juice stocks in canners' hands, February 1, were equivalent to 5,273,000 No. 2 cases, according to the National Canners Association. These are civilian stocks and compare with 7,432,000 cases held on January 1. The stocks include canned tomato cocktail, and mixtures containing 70 percent or more tomato juice.

Indexes

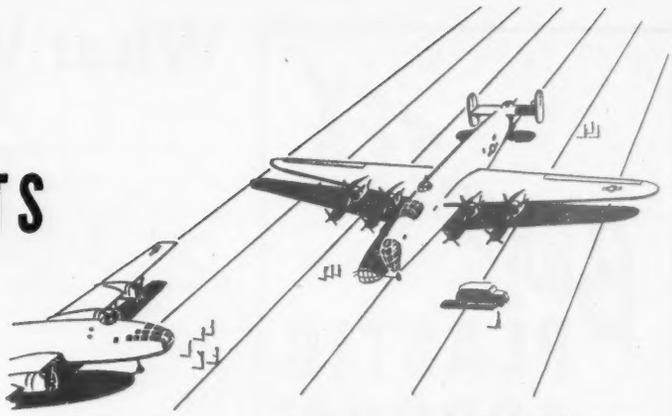
Wholesale price index of foods, compiled by the New York Journal of Commerce, showed 113.3 for the week ending March 16. This compares with the February average of 110.6 and an average of 108.7 for March, 1945.

Business Week's index of business activity, for the week ending March 16, stood at 158.0 as against 145.0 a month ago and 230.1 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded March (thousands)	Total Awarded 1946 (thousands)
Bakery	$ 195	$ 552	$1,801
Beverages	1,520	2,053	10,940
Canning and Preserving	50	340	2,206
Cold Storage	445	150	3,150
Confectionery	40	....	150
Grain Mill Products	820	925	3,709
Ice, Manufactured	100	275	815
Meats and Meat Products	465	....	155
Milk Products	905	472	4,082
Miscellaneous	2,360	2,130	6,378
	$6,900	$6,897	$33,386

FROM LANDING MATS TO AUTO PARTS



DAYTON V-BELT DRIVE ABSORBS SHOCKS

of starts and stops of huge press that exerts pressure of 192 tons

All during the war this huge mechanical press helped to make landing mats for emergency airfields. Now it is turning out auto parts. During these years this press has delivered its 192-ton blow' tens of thousands of times. And each time the six Dayton V-Belts have helped to absorb the shocks of starting and stopping . . . without a single belt failure! Dayton V-Belts can stand such hard service because they are engineered to perform tough jobs, and built of *specialized* rubber for the particular work they have to do. Preferred by industry for power transmission drives, Dayton V-Belts can also solve your power drive problems. Write

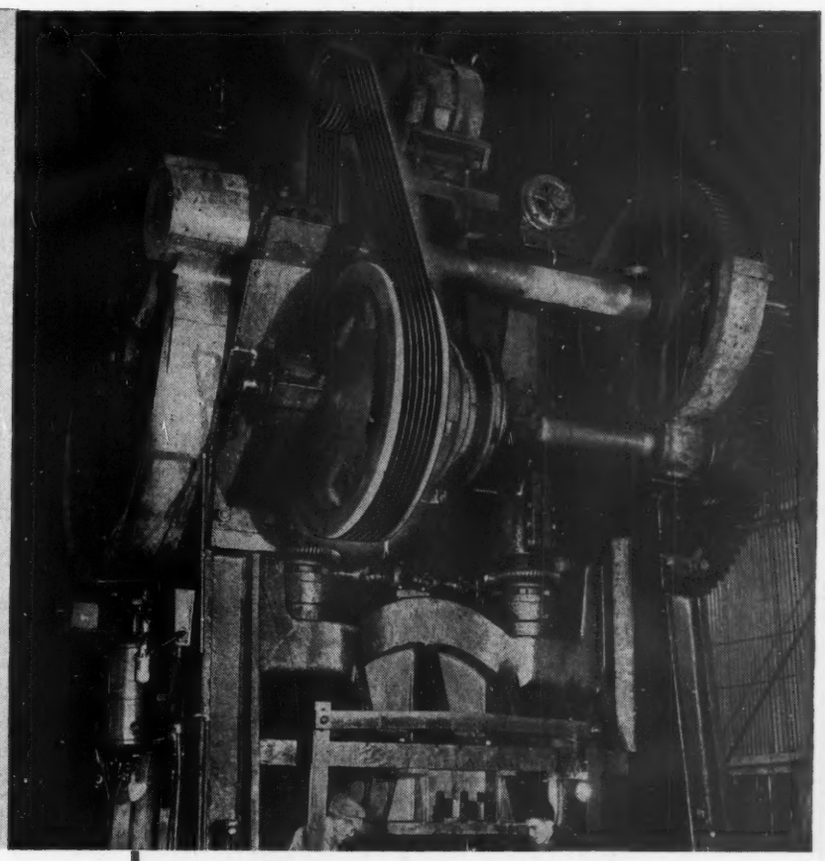
THE DAYTON RUBBER MANUFACTURING COMPANY
DAYTON 1, OHIO

★

ATTENTION POWER TRANSMISSION ENGINEERS:

There is a mill supply house near you that stocks Dayton V-Belts. A representative of this organization will gladly discuss your power transmission drive problems with you. Look for this company under the trade name listing, "Dayton V-Belts" in the yellow pages of your telephone directory.

★



WRITE FOR THIS DAYTON CATALOG TODAY:

The Dayton No. 280 Catalog has 384 pages of data that make selection of Dayton V Belt Drives simple and easy. It's free. Write The Dayton Rubber Manufacturing Company, Dayton 1, Ohio.

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

THE WORLD'S LARGEST MANUFACTURER OF V-BELTS

Basco-TEX

PLASTIC APRONS!

Will Not Crack or Peel

WATER-PROOF, ALKALI-PROOF, STAIN-PROOF, ACID-RESISTANT, OIL-RESISTANT

NO LAUNDERING
Save their cost over and over again!

TOPMOST PROTECTION
Far greater safeguard to clothing than ordinary aprons!

AMAZING STRENGTH
Plus lightness in weight for utmost wearing comfort!

4 COLORS — 4 SIZES

PRICES — SIZES — COLORS

GRAY
27 x 36...$8.40 per doz.
30 x 36... 9.75 per doz.
36 x 40...11.90 per doz.
36 x 44...12.60 per doz.

Full Length Sleeves $9.66 per dozen pair

Leggings, Hip Length $11.90 per dozen pair

BLACK
27 x 36...$8.40 per doz.
30 x 36... 9.75 per doz.
36 x 40...11.90 per doz.
36 x 44...12.60 per doz.

Full Length Sleeves $9.66 per dozen pair

Leggings, Hip Length $11.90 per dozen pair

ALL WHITE
27 x 36...$6.88 per doz.
30 x 36... 7.65 per doz.
36 x 40... 9.35 per doz.
36 x 44...10.18 per doz.

Full Length Sleeves $7.15 per dozen pair

HEAVY DOUBLE COATED MAROON NEOPRENE
27 x 36..$10.61 per doz.
30 x 36.. 12.60 per doz.
36 x 40.. 16.50 per doz.
36 x 44.. 18.45 per doz.

Full Length Sleeves $12.90 per dozen pair

Leggings, Hip Length $23.50 per dozen pair

All Prices F.O.B. Chicago. Furnish best priority. Minimum order 1 dozen.

ORDER BY MAIL OR PHONE TODAY
Free Sample Swatch on Request

ASSOCIATED BAG & APRON CO.
218 West Ontario Street, Chicago 10, Ill.
Phone SUPerior 5809

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

MORE LUXURY—With high spending power otherwise unsatisfied at the retail stores, an increase in the consumption of high-cost manufactured foods is expected. When national income is high the increase in *quantity* of food bought is not great; but the increase in *unit cost* is considerable. Luxury buying is thus a symptom of mild inflation.

ELDER STATESMEN—When Washington calls in former government executives, including a former President of a different party like Mr. Hoover, it is evident that the Administration knows that it is in a jam. Apparently high officials now wish that the President had not so strongly spotlighted the world food scarcity and our need to help starving millions abroad. He and Secretary Anderson now face the necessity of dividing credit for any gains that they may make with those whom they have vigorously criticized in the Republican party. And they stand little chance to have similarly divided responsibility for probable failure.

COASTAL PLANT SITES—Surplus Property Administration is offering numerous coastal sites where shipbuilding was done during the war period with the suggestion that they be converted to manufacturing plant areas. Among the food industries mentioned as logical are sugar refineries, copra-crushing plants, and other large establishments. The advantage of these locations to food companies is the availability of both water and land transportation, power plants and employes and other general service facilities. Large firms looking for water front locations may well investigate.

BALANCED NUTRITION—If everyone in the United States were to have a "nutritionally balanced, moderate-cost food supply," he would use one-fifth more milk, one-quarter more green and yellow vegetables, and 10 to 20 percent more citrus fruits and tomatoes. These increases, above 1945 averages for the "under nourished," are estimates of the Bureau of Human Nutrition and Home Economics of the U. S. Department of Agriculture. The Bureau does not explain what other low-value foods these better fed folks would stop eating in order to make stomach room for this better diet. But other government investigations indicate clearly that for every pound of such better food added to the diet, the average American will have to drop a pound of less advantageous foodstuff. The old problems of inter food competition for a place in the diet cannot be escaped.

GOALS UP—Almost all food production goals for American agriculture have again been raised by Secretary of Agriculture. Contrary to earlier plans, the new requests for larger plantings emphasize corn, wheat, and soybeans. The Department economists have again proven poor guessers as to needs.

DROUGHT OF 1946—Forecasters, who like to prophesy the unpleasant, are now forecasting a failure of the winter wheat crop because of "drought" conditions. The only evidence they have that appears significant is the fact that Providence has been unusually good to the American farmer for a considerable number of years. But no one denies that an extensive crop failure in the United States this year would be a world calamity.

G. I. RIGHTS—Excessive claims for the seniority rights to jobs of returning veterans have met a court setback. A lower trial court ordered "super-seniority" for a certain veteran who sought to have a civilian of greater seniority ousted to give him work preference in the company that he left to go to war. The Circuit Court of Appeals reversed this decision interpreting the veteran's rights as not absolute. Washington expects zealous spokesmen of Selective Service to carry this case to the Supreme Court. Meantime, it will probably be safe for food plant employers to use good sense and a

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

Old Address.....

New Address.....

New Company Connection.....

New Title or Position.....

spirit of justice to guide them in re-employment of returning veterans who can be engaged only by discharge of someone else. But Washington knows that the question is still a difficult one, whenever a court fight is started by a veteran for his "rights."

WEIRD TECHNOLOGY—Good European technology can not always be readily translated to U. S. practice. It takes little imagination to visualize what would happen under both local and federal laws if some American baker should dip bread into a water solution of plastics in order to produce a plastic coating such as German bakers are reported to have used. Like care must be taken in not adopting some of the glowingly described methods for milk sterilization, which use hydrogen peroxide a la German theory and claims. A sane use of the novel reports coming from abroad through OPB is to examine them for things that will really work in the United States, but not to follow the weird technology, which certainly would not be well received in some cases without radical modification. It seems safe to generalize that the American food technologist may learn something from the reports from Germany, but his discriminating good sense will be quite as much needed as his diligence in reading the reports.

OPA PROMISES—Officials of OPA and at the White House promise price relief with emphatic and generous-seeming pledges of cooperation where necessary to eliminate hardship cases. The actual experience of Washington visitors does not indicate any likelihood of getting such speedy relief from OPA, even when new labor and raw material costs completely eliminate profit margins. Visitors find that political methods for getting attention for their troubles are still necessary.

CONTAINERS WORSE—Hardly any class of containers for foods is any more abundant now than during the war period, except possibly metal drums. The maximum ingenuity of the technologists will probably be needed for at least another year to supplement the most persuasive diligence of the purchasing agents, whether it be paper, paraffin, pails, boxes, cooperage or other container requirements that are being considered.

SUBSIDY BATTLE—Two political motives favor continued subsidy to farmers and to food distributors. First is the desire of the members of Congress to favor their constituencies and thus assure re-election in November. Second is a desire to appear to stop inflation by covering up the increases in cost of living. Subsidies to keep retail prices low are like hidden taxes, they hurt the pocketbook but the cause of the hurt is seldom understood by the pocketbook owner.

It is easier to handle and blend Monsanto Sodium Benzoate, U.S.P., in flake form. Unlike powder, Monsanto Sodium Benzoate flakes flow more freely—do not dust and cause annoyance to operators—do not ball when mixing. Ask for samples of Monsanto Sodium Benzoate, U.S.P., in flake and powder form. Try both, and see why flakes are preferred . . . Contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

VODOL

CORN OIL LECITHIN

STABILIZER • ANTIOXIDANT • EMULSIFIER (as agent)

Natural phosphatide extract of corn oil perfected by our process

VODOL
is demonstrating its outstanding qualities in
PACKING INDUSTRIES
BAKING
CONFECTIONS
MARGARINE
DRUGS and COSMETICS

● Here are some of the reasons why VODOL is building a constantly widening market among users of Lecithins, whether large or small.

Neutral as to ODOR and TASTE in End Use

Many comparative proof tests have positively established VODOL'S marked neutrality. Its quality in this respect commends it to products demanding the most exacting standards.

VODOL is instantly soluble at low temperatures. Does not require pre-heating, pre-dissolving, straining nor thinning.

VODOL pours freely. Is easily handled. Disperses in liquid, solid, or semi-solid fats.

VODOL when used in margarine will not darken under normal frying temperatures.

VODOL is available for immediate shipment in drums of 500 lbs., 50 lbs., and 25 lbs. Smaller packages by arrangement.

FROM REPORT OF A LEADING LABORATORY ON VODOL TESTS:

Straight dough bread made up to contain 4% shortening with VODOL added to replace 1.5% of the shortening.

Addition of VODOL gave softer loaf when fresh, and **softer loaf 42 hours after baking.** Softness as revealed by test is expressed in Millimeters and represents compressibility of a slice under load in 10 seconds. The softer the bread, the greater the compressibility. Results:

TEST FOR FRESHNESS

Oven No.	1	2	3	Av.
Fresh: No VODOL .	93	90	89	91
Fresh: VODOL . .	109	104	93	102
42-HR. OLD bread: No VODOL	26	26	33	28
42-hr. old bread: VODOL	42	47	48	45

• • • Bread made with VODOL has superior toasting features—higher color—retained tenderness—improved eating qualities.

***Send for Liberal* FREE SAMPLES *of* VODOL**

LET YOUR OWN TESTS DECIDE

See for yourself what **VODOL** can do for you. FILL OUT AND MAIL COUPON. Samples for conclusive tryouts will come right back to you.

VODOL is the exclusive product of Refining Unincorporated.

REFINING UNINCORPORATED
407 South Dearborn St., Chicago 5, Illinois
Send us samples of VODOL.

QUESTIONS OR REMARKS:.....

.....

NAME OF INQUIRER.....

POSITION WITH FIRM.....

FIRM NAME.....

ADDRESS.....

MEN • JOBS • COMPANIES

INDUSTRY

Acton Foods, Inc., Acton, Ind., a newly formed company, has purchased the Hamlyn Packing Co., also of Acton. Kenneth M. Rider is president of the new company which packs tomato juice, puree and tomatoes.

Barq's Bottling Co., Dallas, Tex., has announced that its new bottling plant, offices, warehouse, shop building and garage are nearing completion. The new unit is expected to be ready for occupancy by April 15.

Blommer Chocolate Co., Chicago, recently has completed a four-story addition to its plant. Plans call for installation of new processing equipment when available.

Bridgford Quick Freeze Co. has begun construction of one of the largest frozen food processing plants in the country on a 20-acre site at Ontario, Oregon. It is estimated that expenditures on the new project will be in excess of $1,000,000. Scheduled for completion by June 12, the plant will have a quick-freeze capacity of 10 tons an hour. The Bridgford concern operates freezing plants at Anaheim and Santa Rosa, Calif., with its main offices in San Diego.

California and Hawaiian Sugar Refining Corp., Ltd., is constructing a plant at Los Angeles to serve as tank-truck liquid delivery service headquarters for the Southern California area. W. R. Junk, manager of the California and Hawaiian liquid products div., will manage the new plant.

Carr-Detroit Biscuit Co., Detroit, has been incorporated for $500,000 by William Nelson, Rockwood, Mich., to manufacture and sell biscuits and crackers.

Chenango Foods, North Norwich, N. Y., has been established as a new canning factory for the processing of green and waxed beans. A. F. Wentzel will be general manager and half owner of the new firm, in partnership with E. B. Clark. The company's brand names will be Chenango Valley and Norwich.

Glacier Packing Co., Inc., Sanger, Calif., is constructing a new $100,000 frozen fruit and vegetable plant which will operate in conjunction with the Sanger Ice and Cold Storage Co. H. J. Loeffler, vice-president and manager, has announced that the plant will be in full operation by May 1, with a planned capacity of 25 tons per day.

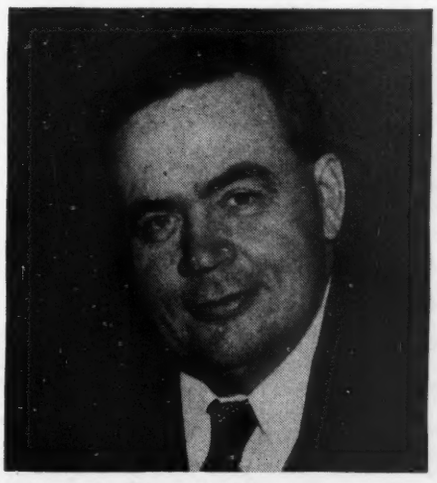
Honor Brand Frosted Foods, Oakland, Calif., is constructing a $300,000 frozen food plant at Oxnard, Calif., which will share operation with the Union Ice Co. of that city. L. T. Hanscum will be in charge of the new unit which will pack lima beans, peas, cauliflower, broccoli, orange and lemon juice and spinach.

John Horne Candy Co., Chicago, is building a $200,000 one-story plant in Evanston, Ill., to be completed the latter part of May.

Kraft Foods Co. has purchased a 45-acre tract in Kendallville, Ind., for the construction of a $750,000 caramel plant which will employ 300 persons.

HARRISON F. ANDERSON

Formerly director of public relations for General Mills, Inc., Harrison F. Anderson has been appointed to the newly created post of director of informational services, Brand Names Research Foundation, Inc., with offices in New York.



DR. IRA N. GABRIELSON

An authority on wild life conservation for the past thirty years and most recently, director of the Fish and Wildlife Service, U. S. Department of the Interior, Dr. Ira N. Gabrielson has retired "to go fishin'."

Libby, McNeill & Libby has begun construction of a $300,000 concrete and steel receiving and processing cannery adjacent to the present plant in Sunnyvale, Calif.

John Morrell & Co. has announced its intention to build a new $500,000 meat-packing plant at Oakland, Calif. Construction will begin this spring.

Oregon Foods, Inc., a newly formed organization, plans immediate construction of a fruit and vegetable canning plant at McMinnville, Oregon. The unit is scheduled for completion by July 1, and the 1946 pack is estimated at 1,500 tons of prunes and 600 tons of beans.

Reid, Murdoch & Co. recently announced the appointment of Ray A. Yocom as supervisory plants manager of all Monarch Finer Foods canning plants. Mr. Yocom is located in the Chicago headquarters of the company.

San Diego Packing Co. has begun operation of its new tuna cannery in San Diego, Calif. The $500,000 plant, a prefabricated sheet-iron building, is equipped to handle 150 tons of raw tuna a day. E. M. Derriman is president of the concern.

Southern Manufacturing Co. recently has been organized at Blytheville, Ark. The new firm will dehydrate wood products and vegetables. In the near future, the company expects to undertake the manufacture of dehydration equipment for sale.

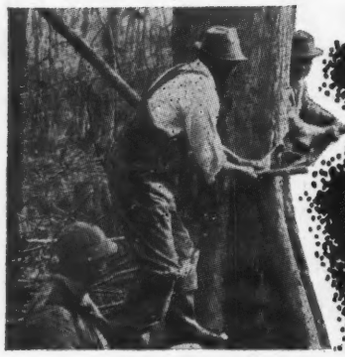
United Foods, Inc., Tacoma, Wash., has begun construction of a plant for the manufacture of potato chips, salted nuts and pop-corn. Marcus Nalley is president of the firm.

PERSONNEL

Robert E. Bauer, formerly of the Army Quartermaster Corps, has joined Deerfield Packing Corp., Bridgeton, N. J., as packaging engineer.

Marc Bloch has been appointed purchasing agent for the National Dairy Products Corp. Associated with the company since 1924, he succeeds the late Edward R. Scott.

Lt. Joseph Czarnecki, formerly with the Meat Products Branch of the Quartermaster Subsistence Research and Development Laboratory, Chicago, has



TIDEWATER
RED CYPRESS
Is the Answer to Any Problem of DECAY, ODOR, TASTE or ACID!

...Its Superior Qualities Make It Ideal for a Wide Range of Industrial Uses

The Indians knew it, the Spaniards knew it, the French knew it, and those of English decent of the Southeastern regions have known for 150 years the superior qualities of Tidewater Red Cypress and its resistance to decay. Along the Atlantic Coastal Plain where lie buried cypress trees that grew over 100,000 years ago in the Pleistocene Age, many of which have since been dug up, give mute evidence of the lasting qualities of cypress never equalled for its decay resistance. In more recent years industry has also learned that it licks the difficulties of odor, taste and acid. Tidewater Red Cypress has ALL the qualities you demand for many specific industrial demands.

Tidewater RED CYPRESS

Tide Water Red Cypress "The Wood Eternal"

CAN BE FURNISHED FROM ST. LOUIS STOCKS

FLEISHEL LUMBER CO.
4235 DUNCAN AVE. • ST. LOUIS 10, MO. • NEwstead 2100

TIME SAVER

Look for imprint "La Porte" in metal to be sure it's a La Porte.

***LA PORTE* FLEXIBLE STEEL CONVEYOR BELTING**

Sorting, grading, washing, cooking—also packing and shipping are handled faster and easier with La Porte Flexible Steel Conveyor Belting. Steel mesh feature allows free circulation of air and liquids around products in process; also facilitates sterilizing with steam gun or hot water. Resists rust, acids and extreme temperatures. Saves time on maintenance as well. Will not weave, creep, jump nor stretch. No special dressing or belt lacers needed to keep it at peak efficiency.

Ask your Supplier today. Available in any length and practically any width.

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

joined the staff of Griffiths Laboratories, Chicago.

A. E. Coddington has left Ladoga Canning Co., Indianapolis, Ind., to organize Quality Products Co., Mt. Comfort, Ind. Mr. Coddington is president of the new company which will pack tomato juice, tomatoes, pork and beans and kidney beans.

Harry Dagger, formerly director of the National Cream Quality Control Program, is now executive secretary of the American Bulk Condensed Milk Association, Chicago.

Col. E. DeTreville Ellis has assumed temporary command of the Chicago Quartermaster Depot, succeeding Col. R. A. Isker who has separated from the Army.

Frank Emmett has assumed management of the Cudahy Packing Co., in Victoria, Texas. He succeeds A. R. Hartman who has resigned.

Harry C. Ferguson has been elected president and general manager of the Kinston Packing Co., Kinston, N. C.

E. G. Laughrey, formerly in the Research Department of Pabst Brewing Co., Milwaukee, Wis., has become laboratory supervisor for Flavor Service Co., Chicago.

William C. Launder is in charge of manufacturing for S. C. Clayton Co., Inc., South Boston, Mass., producers of Za-Rex and Phrosto sirups and fountain supplies.

C. O. Matheis, vice-president of Walter H. Johnson Candy Co., Chicago, has been elected president of the Chicago Candy Association. Other officers include H. F. Oblander and A. F. Dirksen.

John E. Nagel has been appointed assistant to the president of Coca-Cola Bottling Company. In his new capacity, he will take charge of sales and advertising for all company-operated plants. His headquarters will be in Chicago.

Lawrence G. Preston, formerly vice-president in charge of sales for American Maize Products Co., Chicago, has been elected executive vice-president of the company, with headquarters in New York.

John G. Remsen, recently has been made chief chemist of the Taylor-Reed Corporation, Mamaroneck, N. Y.

Charles M. Robertson, for four years president of the Kroger Co., has been elected to the newly created office of chairman of the board of directors. Joseph B. Hall, executive vice-president and treasurer, moves up to the office of president. Company name formerly was Kroger Grocery and Baking Co.

"That reminds me, I must buy more foods in those handy, large-mouthed, modern Foster-Forbes Fruit and Vegetable Jars."

SALES REPRESENTATIVES . . .

KANSAS CITY · CLEVELAND · ATLANTA
DETROIT · MILWAUKEE · NEW YORK
CINCINNATI · ST. PAUL · MEMPHIS
CHICAGO · ST. LOUIS · LOUISVILLE
HAVANA, CUBA

FOSTER-FORBES

FRUIT AND VEGETABLE JARS

FOSTER-FORBES GLASS CO., MARION, INDIANA, U. S. A.

Air Express Goes Everywhere FASTER!

Rates slashed 22%—now more than ever, a money-making "tool" for every business

No matter where you do business, even in the smallest town, the speed of Air Express is at your service — between thousands of U. S. communities and scores of foreign countries.

Yes, when "getting something fast" means better serving a customer or clinching a deal, keeping a factory open and men at work — Air Express more than pays its way. It's a money-maker.

Specify Air Express-Better Business Buy Than Ever

RATES CUT 22% SINCE 1943 (U. S. A.)					
AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs.	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07c
349	1.02	1.18	2.30	3.68	9.21c
549	1.07	1.42	3.84	6.14	15.35c
1049	1.17	1.98	7.68	12.28	30.70c
2349	1.45	3.53	17.65	28.24	70.61c
Over 2330	1.47	3.68	18.42	29.47	73.68c
INTERNATIONAL RATES ALSO REDUCED					

In the face of rising prices, Air Express rates have been slashed 22% since 1943, saving business millions of dollars. And rates include special pick-up and delivery in all principal U. S. towns and cities — with fast, co-ordinated air-rail service between 23,000 off-airline points. Service direct by air to and from scores of foreign countries in the world's best planes, giving the world's best service — at lowered cost.

AIR EXPRESS

GETS THERE FIRST

Write Today for new Time and Rate Schedule on Air Express. It contains illuminating facts to help you solve many a shipping problem. Air Express Division, Railway Express Agency, 230 Park Avenue, New York 17, N.Y. Or ask for it at any Airline or Railway Express office.

Phone AIR EXPRESS DIVISION, RAILWAY EXPRESS AGENCY
Representing the AIRLINES of the United States

Maj. Hatton B. Rodgers, Jr., has joined the supervisory staff of Phillips Packing Co., Inc., Cambridge, Md. He has been with the Quartermaster Corps, Chicago, and prior to the war, was a member of the laboratory staff of National Canners Association.

Lewis E. Russell has been appointed vice-president of production for the Bulk Prepared Mix Division of Pillsbury Mills, Inc., with headquarters in Springfield, Ill.

Louis Sair, formerly with Canadian Research Council, and more recently in charge of protein research at Central Soya Co., Decatur, Ind., now is associated with Griffith Laboratories, Chicago, as research chemist.

Gerhardt Schild, formerly production manager of Kress Egg Products Co., Chicago, recently became production manager of S. Wyler Co., Chicago.

W. L. Schlack, formerly with the cereal and baked products branch of the Quartermaster Subsistence Research and Development Laboratory, Chicago, now is associated with Whitey Donut Co., Chicago.

Lt. Philip Stoltz, formerly with the Dairy Products Branch of the Quartermaster Subsistence Research and Development Laboratory, Chicago, has returned to Mojonnier Bros., Chicago.

John Ware, who has been with General Mills, Inc., in Brazil, now is with Welch Grape Juice Co., Westfield, N. Y.

Richard J. Werner is the new general manager of the California Dairy Council, San Francisco. He succeeds Sam H. Green, who has been general manager of the Council since it was founded 27 years ago. Mr. Green now becomes executive director for life.

DEATHS

L. J. Auerbacher, 71, electrical engineer and former director of medical relations for the Borden Co., February 20, St. Petersburg, Fla.

Maxwell A. Baird, assistant sales manager of the Fairmont Creamery Co., Buffalo, February 18.

Walter L. Cherry, 72, chairman of the executive committee of Cherry-Burrell Corp., February 5, Evanston, Ill.

John M. Clair, 58, chief executive officer of the Republic Food Products Co., Chicago, February 19.

Charles H. Foit, 70, past president of Ohio Bakers' Association, February 26, in Ironton, Ohio.

what's your need in SIZE?

Globe supplies seamless and welded stainless steel tubing ranging from an outside diameter less than that of an average lead pencil — 1/8 inch — up to 6 inch outside diameter (Iron Pipe Size).

Thick-walled, seamless pressure tubes in carbon and alloy steels from 1/2 inch up to 6 5/8 inch outside diameter for huge boilers in utility and industrial power plants are supplied by Globe, as well.

Your tubing needs may lie somewhere between these two extremes — whatever your requirements, standard or special in a wide range of sizes, shapes, and analyses, Globe is qualified by experience and facilities to supply you with tubing of the quality and uniformity you demand.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin

GLOBE TUBES

★ STAINLESS STEEL TUBES ★ PRESSURE TUBES ★ GLOBEIRON TUBING ★ GLOWELD TUBES
★ CONDENSER AND HEAT EXCHANGER TUBES ★ MECHANICAL TUBING

5025

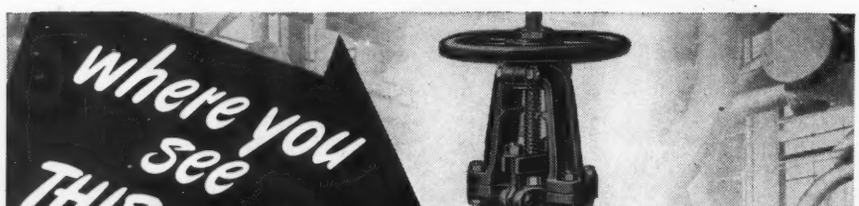


Fig. 2125 Bronze Gate

you know you're buying BETTER EQUIPMENT

● **The installation of Lunkenheimer Valves, Lubricators, or Air Devices on power equipment is an indication that the equipment itself is of *superior construction and efficiency.***

It's the quality-minded manufacturer who selects Lunkenheimer products for his equipment. He knows the Lunkenheimer reputation for correct engineering, advanced design, superior workmanship . . . he knows his equipment will give better performance with less trouble, when fitted with Lunkenheimer Valves or other devices.

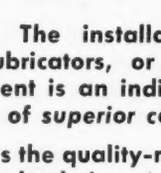
He knows, in short, that his own product is thus given added salability, and in use will give the purchaser maximum results at minimum cost.

Whenever and wherever you purchase power equipment units, you'll be wise to look for the Lunkenheimer name on valves and lubricators —a *positive guide to value.*

THE LUNKENHEIMER COMPANY, Cincinnati 14, Ohio, U.S.A. (Offices: New York 13, Chicago 6, Boston 10, Philadelphia 7. Export Department: 318-322 Hudson Street, New York 13, N. Y.)

Fig. 16 "Renewo" Globe

Fig. 1430 Iron Body Gate



● *Perhaps YOU Have A Product That Can Be Given This Added Sales Advantage. If your products require the use of valves, lubricators, air devices, or boiler mountings, the name Lunkenheimer on such equipment will provide extra sales appeal. For further information see your nearest LUNKENHEIMER DISTRIBUTOR.*

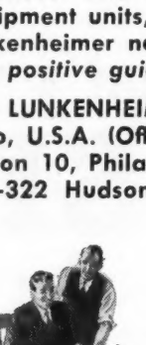


Fig. 1834 "Alvor" Constant Level Oil Control

Fig. 1571 Air Cock 150 Lb. Pressure

LUNKENHEIMER VALVES

BRONZE, IRON, STEEL, AND CORROSION-RESISTANT ALLOY VALVES
AIR DEVICES, LUBRICATORS, AIRCRAFT FITTINGS

Carl H. Schroeder, 57, director of poultry research and service for General Mills Corp., at the Larro Research Farms near Detroit, February 13.

Charles R. Steinle, 73, superintendent of preserves department, Oelerich and Berry Co., Chicago, recently.

Guy A. Thomas, 71, director of National Tea Co., and board chairman of Colorado Milling and Elevator Co., Denver, Colo., recently.

ASSOCIATED INDUSTRIES

American Can Company plans the construction of a $1,000,000 can manufacturing plant at Fort Smith, Ark. Construction will begin as soon as materials are obtained. The company hopes to be able to make deliveries for the 1946 winter crop.

Armstrong Cork Co., Lancaster, Pa., has announced the appointment of K. C. Lyon as chief of glass research and J. M. Sharf, chief of closure research, to assist E. C. Emanuel, chief chemist of glass and closure products.

Continental Can Co. recently has announced the election of T. C. Fogarty as vice-president in charge of sales, and Paul E. Pearson, vice-president in charge of operations.

Jamison Cold Storage Door Co., Hagerstown, Md., has announced the return of J. V. Jamison, III, from the Armed Forces. He has resumed his duties as president of the company.

Food Machinery Corp. has announced the election of Ben C. Carter and William de Back to the board of directors and executive committee.

Milprint, Inc., through its vice-president, Roy Hanson, has announced that Maj. Jack Manion has taken over the management of the meat-packers division.

Reliance Electric & Engineering Co. has broken ground for a new plant in Ashtabula, Ohio. The $750,000 one-story plant will contain 120,000 sq. ft. of manufacturing area.

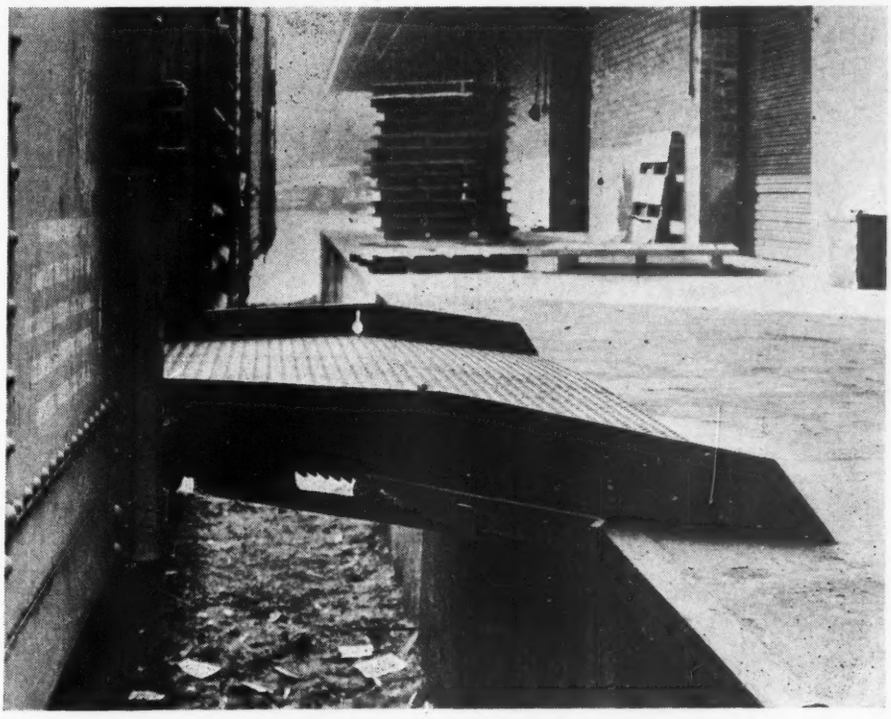
Wyandotte Chemicals Corp. has announced the appointment of L. D. Dotson as sales head for the Calcium Chloride Division.

York Corp. recently has formed an international division with headquarters in New York. James C. Tweedell is manager of the new unit.

FOOD EQUIPMENT NEWS

Bridge Ramp

MADE by Pallet Engineering Co., Dept. I, San Francisco, this ramp has a positive locking device, which is adjustable to take care of different distances to be bridged and is crowned to compensate for different levels existing between cars and docks. High side rails prevent trucks from overrunning sides of the plate and beveled edges permit easy entry onto the ramp without damage to truck tires. It is constructed for one man placement and removable.



One-man bridge ramp.

Temperature Recorders

BACHARACH INDUSTRIAL INSTRUMENT CO., Dept. I, 7000 Bennett St., Pittsburgh 8, Pa., is now producing a line of recorders for room and atmosphere temperature, and electrical operation. Outstanding features claimed for these instruments include easy chart replacement. This is so because pen and bi-metallic temperature element of recorder and actuating mechanism are in door. When door is open, pen swings out of the way, permitting clear, unobstructed view of complete record and easy chart replacement without danger of damage to pen mechanism. The 4-in. charts are self-centering. The instrument fits into a space 4½x5½x7½ in. A recess in the back of the recorder holds extra charts and ink bottle with glass dropper.

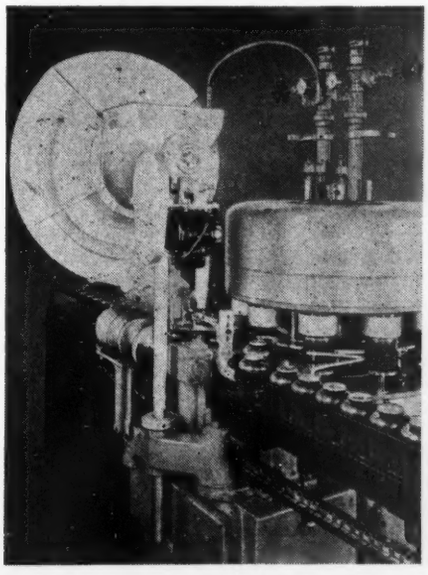
Coffee Jar and Vacuumizer

OWENS-ILLINOIS GLASS CO., Dept. I, Toledo, Ohio, announces the development of a jar, metal cap and a high speed machine for vacuum-packed coffee.

The jar and cap are said to be capable of holding instantaneous blowoff pressure of 20 lb. per square inch. They are designed to hold peak vacuum and the cap is said to be easily removed and resealed. It measures 5⅝ in. tall, which is ⅞ in. shorter than the screw-cap coffee jar. It averages one ounce less in weight and has a 66 mm. orifice.

The vacuumizing machine is a 10-head rotary unit capable of handling 120 jars per minute. It has an automatic cap hopper, simplified gravity cap feed and special controls that maintain peak vacuum efficiency even if one or more heads lack either a cap or a jar. The flexible cap supplied resembles the hermetic closure used on glassed fruits and vegetables. Both have vertical sealing surfaces on the jar's finish, and both are pressed on and pried off.

The jars ride individual platforms in the vacuumizing unit and each cap is lifted clear of the jar by magnet before the two-stage vacuum cycle begins. Now each cap is driven home by a verticle pusher before the package emerges ready for labeling.



Coffee jars being discharged from vacuumizing unit.

Spray Hose

UNITED STATES RUBBER CO., Dept. I, Rockefeller Center, New York City, announces the development of a spray hose constructed with special yarn perfected during the war that gives the hose lighter weight and increased strength. The hose is especially designed for spraying fruit orchards and field crops infested with insects. It is made of synthetic rubber, reinforced with two layers of fabric woven with "Ustex," a cotton yarn treated with plastics to increase its strength as much as 70 per cent. This hose was formerly built with three layers of untreated cotton yarn, giving it greater weight and bulk, but less strength and flexibility than the new product.

Conveyor Trolley

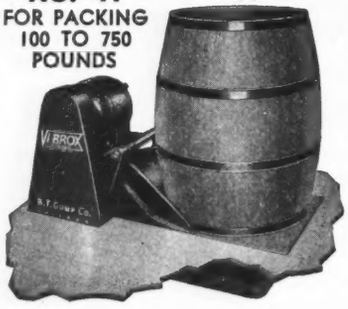
LINK-BELT CO., Dept. I, 307 N. Michigan Ave., Chicago, Ill., announces the development of a free-rolling conveyor trolley. It is not designed as is the conventional I-beam trolley. This one has no wheel shafts, nor spindles, and is said not to require separate retainers for its full complement of hardened, accurately balanced alloy steel balls. The illustration, with part of the trolley cut away, shows that the two basic elements, namely, the wheel and the

WHAT SIZE *Containers* DO YOU PACK?

NO. 11
FOR PACKING
5 TO 15 POUNDS

NO. 21
FOR PACKING
25 TO 75
POUNDS

NO. 41
FOR PACKING
100 TO 750
POUNDS



Users report Big Savings with

VIBROX PACKERS

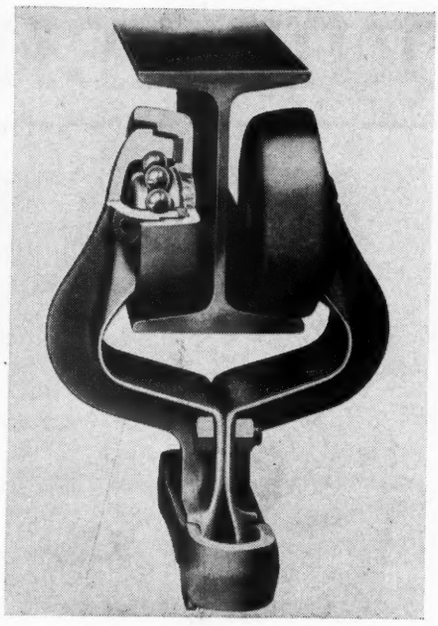
Containers ranging from as little as 5 pounds to as big as 750 pounds can be packed quickly and efficiently with a VIBROX. Its smooth, fast, continuous, vibrating-rocking motion packs down and settles materials so effectively that smaller sized containers can usually be used. Vibrox Packers offer big savings in labor, containers, shipping space, and shipping costs for packing dry, powdered, granular, and certain flaked materials. Send us a sample of your product. We'll gladly VIBROX-test it and report results with facts and figures.

MAKERS OF: *Equipment for Grinding, Sifting, Mixing, Feeding and Weighing of Dry Food Products.*

B. F. Gump Co.

Established 1872

454 South Clinton Street Chicago, Ill.



Ball bearing conveyor trolley.

bracket themselves, form the inner and outer races for the bearing. The inner bearing race is a part of the wheel bushing and revolves within the outer race formed by the head of the trolley bracket. In the conventional trolley construction, the inner bearing race is mounted on a fixed shaft and the outer race revolves around it as part of the trolley wheel.

The revolving inner race distributes wear completely around the ball path. All fixed points of pressure are on the outer race, where the larger diameter provides a greater area of distribution and, consequently, greater resistance to wear.

Bearings are assembled by holding the wheel in position on the head of bracket and then dropping the balls into race groove through a ball loading hole at the back of bracket. When the race is filled with balls, a plug is inserted into the hole. The plug, however, provides an open hole for lubrication, either manually or by means of an automatic system, or it may be equipped with an Alemite lubrication fitting.

Protective felt seals and adequate lubrication reservoirs are important features of the design. Wheels and brackets are drop forged steel, with ball races accurately machined and hardened.

Sealing Machines

PACK-RITE MACHINES DIVISION of Techtmann Industries, Inc., Dept. I, 828 N. Broadway, Milwaukee 2, Wis., announces a Model "E" Krimpac machine. This model seals the visible package used for candy bars, cookies, cakes, doughnuts and similar single-unit or assembled items, automatically heat-seals bottom of package, krimps both ends of package, seals small space at ends of package, between bottom and krimp, and uniformly trims krimped ends and discharges packages. Operators place cellophane around package and feed it into machine.

Improved, interchangeable stainless steel pushers, equipped with snap-lock clip and detachable pusher wings, incorporate a definite improvement over the Model "D."

Said to be instantly adjustable without tools, the Model "E" usually saves cellophane area due to the krimped ends and small bottom seal required. The machine is obtainable in lengths from 4 to 14 ft.

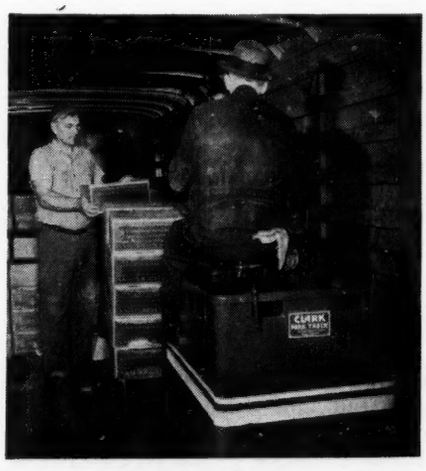
Electric Hoist

LISBON HOIST & CRANE CO., Dept. I, Lisbon, Ohio, is introducing their "Bob Cat Model" electric hoist. It is claimed that their design permits reducing its weight to approximately one-half of the conventional design for the same capacity. It is said to have the smallest overall dimensions of any standard hoist.

It is made in three general sections, permitting easy access to any part by the removal of about four bolts. It is said to have a safety factor of six to one and is made entirely of steel forgings and castings, plus the cable. The motor is entirely inclosed in a drum. It has ball bearings throughout and heat-treated alloy steel gears.

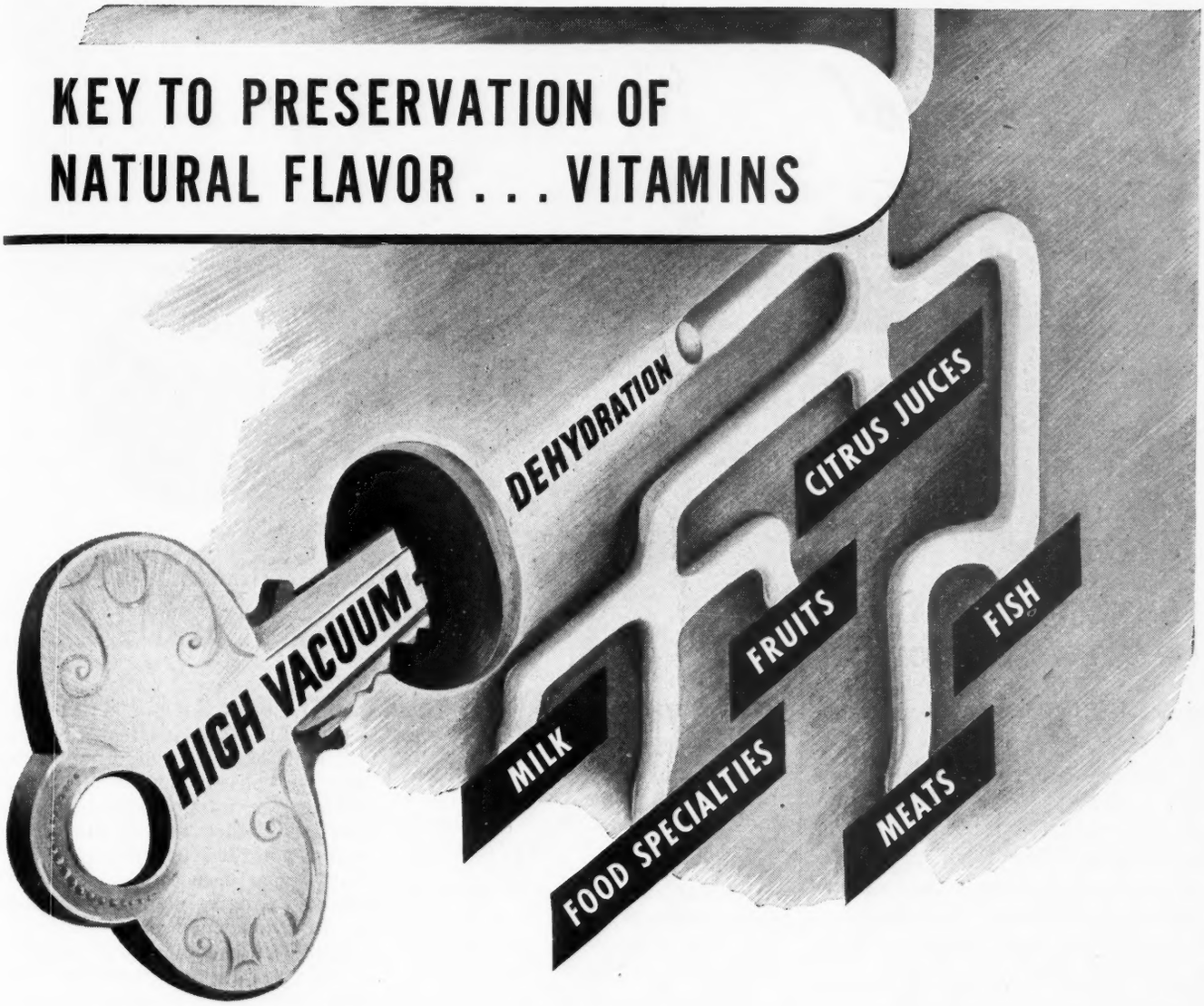
Fork Truck

EZRA W. CLARK, Dept. I, Battle Creek, Mich., has introduced a compact, lightweight fork truck designed to lift, carry, stack and tier unit package loads weighing up to 1,000 lb. It is maneuverable in narrow aisles and has a small turning radius of 57 in.



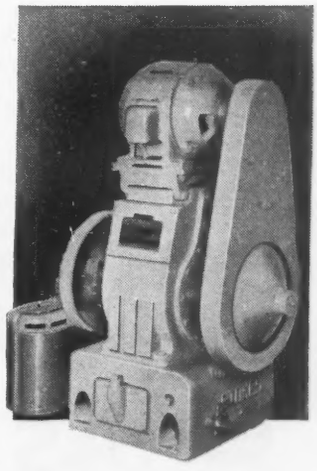
Lightweight fork truck

KEY TO PRESERVATION OF NATURAL FLAVOR . . . VITAMINS



Delicate flavors . . . complete vitamin content . . . natural goodness — all can now be captured by a new and amazingly effective method for dehydration and preservation of many food products.

The process is one of sublimation or "freeze-drying" under high vacuum at low temperatures. It is the same process used in developing the vast blood plasma and penicillin programs. Stokes pioneered and developed the equipment for this process — vacuum stills, dryers, pumps, gages . . . and by continuing research has adapted it successfully to the commercial processing of foods.



Citrus fruit juices, for example, are sublimed into the form of crystals . . . easily packaged and preserved. Replacing the water that has been removed, instantly reconstitutes the juices . . . juices in which are retained all the delicate flavors and vitamins and food values of the tree-ripened fruits. With meats, shell fish, fruits, tomato juice, coffee, extracts, milk and food specialties, freeze-drying has proved equally successful.

Stokes' 40 years of experience in the field of high vacuum, plus a wealth of new research knowledge on sublimation, offer food processors a rich source of help in planning for tomorrow's market.

Investigate High Vacuum now! Write to F. J. STOKES MACHINE CO., 5976 Tabor Road, Philadelphia 20, Pa.

50th year of Service to Industry

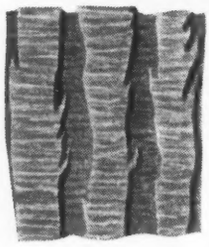
F.J.Stokes *High Vacuum*

FJS Est 1895

PUMPS · GAUGES · EQUIPMENT

Stop Liner Breakage!

CHASE CRINKLED and PLEATED LINERS



CRINKLED AND PLEATED

THEY S-T-R-E-T-C-H IN *EVERY* DIRECTION

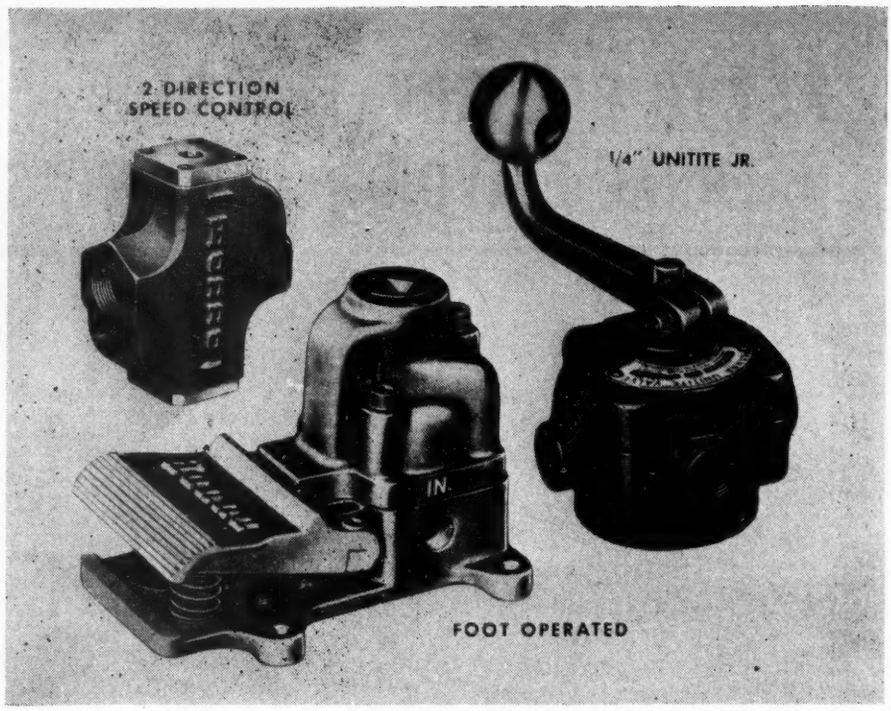
BIG NEWS for users of liners. Chase C. & P. Liners are crinkled for vertical elasticity and pleated for horizontal elasticity. It's the protective feature which provides plenty of flexibility in all directions! Result: no more broken liners nor costly damage to contents due to liner failure or breakage.

Write today. Let us tell you more about Chase Crinkled and Pleated Liners—it's the better liner that actually costs no more!

CHASE BAG CO.

GENERAL SALES OFFICES
309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MINNEAPOLIS
ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE • PITTSBURGH
BUFFALO • KANSAS CITY • MEMPHIS • GOSHEN, IND. • PHILADELPHIA
NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY • OKLAHOMA
CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS
CHAGRIN FALLS, O. • HUTCHINSON, KAN. • WINTER HAVEN, FLA.



Control valves.

Control Valves

THREE VALVES for air and hydraulic controls said to be simple in construction are being marketed by the Hann Engineering Works, Dept. I, 1765 Elston Ave., Chicago 22, Ill.

One type is a packless ¼-in. capacity valve for tubing and light piping applications. It is precision-built and said to be permanently tight. It is designed for four-way operation but may be used on a three-way valve by plugging one port and is suitable for air, oil or water in pressures up to 250 psi. An 80 deg. handle movement gives complete reversal.

The second is a foot-operated packless valve for use in air and oil hydraulic cylinder applications. It is made in two styles, one with a single pedal for constant cycle of operation, and two, with a split pedal that holds position until tripped for reversal. It is available in four sizes from ⅜ in. up to 1 in. It operates on 250 psi. air pressure or 1,000 psi. oil pressure.

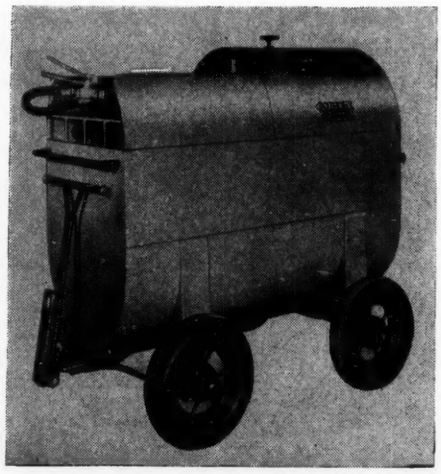
The third is a cylinder piston two-direction speed control valve. It provides for adjustable control of inflow and outflow of air or oil independently to and from one side of the piston.

Fire Extinguisher

A NEW MODEL, wheeled portable fire extinguishing unit with a capacity of 750 lb. of liquid carbon dioxide is now available in most major industrial areas of the country. The unit is marketed by Cardox Corp., Dept. I, 307 N. Michigan Ave., Chicago 1, Ill. A unique feature of the unit is its extremely high application rate. It delivers 300 lb. of carbon dioxide per minute from a single nozzle. Shielded behind the cooling screen afforded by this mass discharge, one operator is said to be able to extinguish a relatively large fire in seconds.

Liquid carbon dioxide is stored in a refrigerated and insulated pressure vessel at a constant temperature of approximately 0 deg. F. and 300 psi. At this temperature, the liquid carbon dioxide yields 47 per cent CO_2 "snow" when released.

The units are manufactured in three types: (1) An all-purpose, indoor-outdoor unit, equipped with pneumatic tires, that may be either hand-propelled or attached by its



Liquid carbon dioxide portable fire extinguisher.

STAINLESS STEEL IS ALWAYS IN GOOD TASTE

As a food processor, your greatest asset is the distinctive, uniform flavor and natural color of your product. ARMCO Stainless Steel equipment guards this precious taste and color.

Stainless is a sanitary metal too. Its dense, smooth surface does not harbor bacteria and is not affected by common sterilizers.

Food plant men say visitors are always impressed by the spotless luster of stainless steel equipment. Its rustless surface is magically easy to clean—saving time, labor and money in the bargain.

The exceptional durability of ARMCO Stainless makes it even more economical. It is a solid alloy steel . . . no plating or finish to wear off. Its great strength and resistance to wear and tear means fewer replacements.

ARMCO Stainless belongs in your plans for improvement or expansion. Its attractive appearance, durability and cleanliness will protect the quality of your product and help cut production costs. Write for our free booklet on how to get the most value out of stainless equipment. The American Rolling Mill Company, 341 Curtis Street, Middletown, Ohio. Export: The Armco International Corporation.

MADE OF ARMCO STAINLESS STEEL

Special-Purpose Sheet Steels

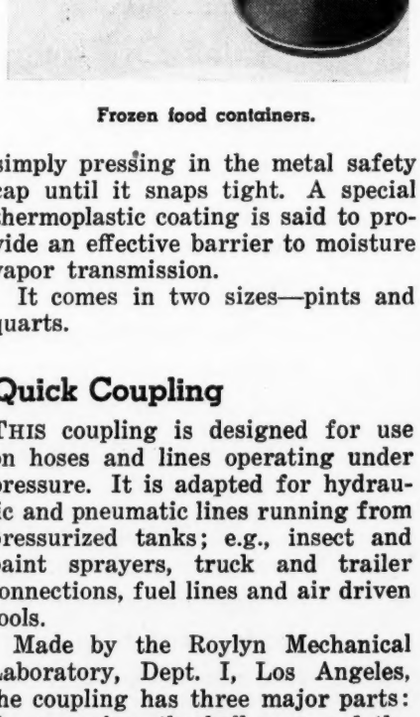
THE AMERICAN ROLLING MILL COMPANY

A SAVING AT EVERY TURN
• Reduce Floor Wear to a minimum.
• Increase efficiency of employees.
• Eliminate wracking of equipment.
• Save time, speed up production.
Free DARNELL MANUAL
DARNELL CORP. LTD. 60 WALKER ST. NEW YORK 13, N.Y.
LONG BEACH 4, CALIFORNIA 36 N. CLINTON, CHICAGO 6, ILL.
DARNELL
CASTERS & WHEELS

trailer hitch to any industrial power truck, (2) a steel caster unit designed for extreme maneuverability and close clearances indoors and (3) a motorized unit for industries and operations requiring a unit capable of traveling comparatively great distances quickly. All are equipped with the "snow-separation" nozzle, 50 ft. of hose and a squeeze valve that gives instant control of the carbon dioxide discharge.

Paper Containers With Snap-In Lid

FROZEN FOOD containers, liquid tight, made of paperboard with a snap-in metal closure, are announced by Container Corp. of America, Dept. I, 111 West Washington St., Chicago. After the container is filled, it is sealed by



Frozen food containers.

simply pressing in the metal safety cap until it snaps tight. A special thermoplastic coating is said to provide an effective barrier to moisture vapor transmission.

It comes in two sizes—pints and quarts.

Quick Coupling

THIS coupling is designed for use on hoses and lines operating under pressure. It is adapted for hydraulic and pneumatic lines running from pressurized tanks; e.g., insect and paint sprayers, truck and trailer connections, fuel lines and air driven tools.

Made by the Roylyn Mechanical Laboratory, Dept. I, Los Angeles, the coupling has three major parts: the cam ring, the ball cage and the nipple. By rotating the cam collar, steel balls are forced inward into a groove in the nipple, forcing the halves together. The gasket, retained in the ball cage, provides a positive seal against dirt as well as

Give Your Products the Seal of Approval

WITH

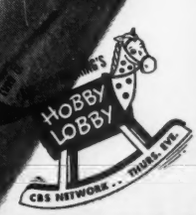
Anchor T Caps

PACKAGES sealed with Anchor T Caps have had the housewife's approval for many years. She has purchased many of her favorite jellies, jams, preserves, meats, pickles, mustard and other products in tumblers sealed with Anchor T Caps. She recognizes their dependability and likes them because they are easy to remove and reseal.

Attractive and efficient, Anchor T Caps provide positive, permanent seals and give complete protection for products packed in thin pressed, thin blown, flared, wide flared or bead finished tumblers.

The mechanically formed side seal effectively overcomes all top edge imperfections peculiar to thin blown tumblers and holds caps in place, with or without vacuum. Like the hoops on a barrel, Anchor T Caps give added strength to thin wall containers.

You give your products the seal of approval when you seal them with Anchor T Caps.



Anchor
CONTAINERS and CAPS

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

ANCHOR T CAP

PROTECTION + SALES APPEAL
for
FOOD PRODUCT PACKAGING

Shippers of packaged foods find in Hummel & Downing Company's integrated production and customer services the answer to most of their problems in selection of the best folding or display cartons and shipping cases. We take entire responsibility for the package from the boxboard to printing the finished carton.

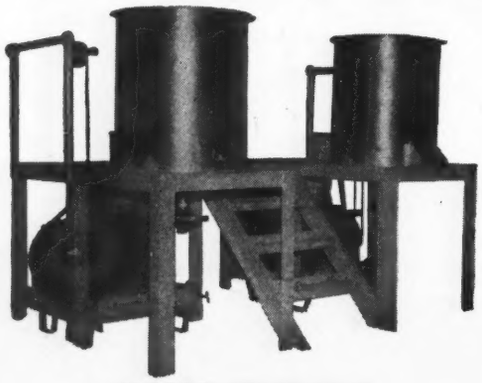
HUMMEL & DOWNING COMPANY
MILWAUKEE 1, WISCONSIN

Waste Paper is a Vital Raw Material . . . SAVE IT . . .

GLASCO TRADE MARK PRODUCTS

CUSTOM-FABRICATED
METAL EQUIPMENT
FOR BETTER
FOOD PROCESSING

INDUSTRIAL CUSTOM-FABRICATORS FOR 35 YEARS



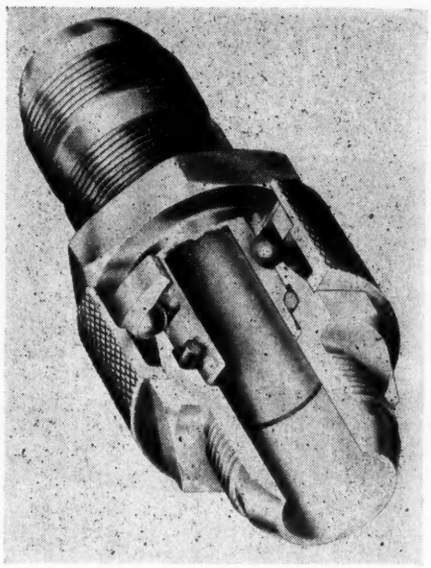
GLASCO EQUIPMENT
IS FABRICATED IN ALL METALS

Our plant and facilities are complete for the fabrication of equipment from the following metals: Aluminum, copper and brass, galvanized steel, lead and zinc, Monel metal, stainless steel, stainless-clad steel and iron, structural steels and tin.

GLASCO
MIXER
FOR MAYONNAISE

HERE is a typical unit for food processing, *Fabricated-to-Order* by GLASCO. We make all types of mixing and handling equipment for food plants, in any design, any gauge, any metal . . . all sanitary, corrosion-resistant, sturdy, and good looking. Our Containers, Buckets, Trays, Trucks, Tanks, Bins, etc., are Ordered—and re-ordered—by successful food processors the country over.

GUSTAV GLASER CO., INC. AND ITS SALES SUBSIDIARY GLASCO EQUIPMENT CORP.
HOME OFFICE & PLANT TWO WAIT ST PATERSON N J
NEW YORK CITY OFFICE 501 FIFTH AVE

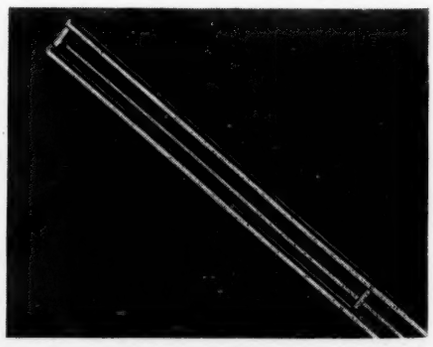


High pressure coupling.

being the separating spring force necessary to the operation of the lock. Tests made with the alloy steel model showed a temperature operating range of from —65 deg. F. to +300 deg. F., with safe pressure limits of 1,680 psi for the 2-in. coupling and 11,500 psi for the ¼-in. unit. Couplings are available in aluminum, brass, alloy or stainless steel with correct gaskets to withstand fuels, oils and acids. Pipe threads or flared connections are optional with caps to fit all sizes of nipples. Standard thread sizes run from ¼ in. to 2 in., with larger sizes available.

Smokestick

SAID TO BE able to withstand the hardest kind of use for the smoking of frankfurters, wieners, and fresh pork sausage is a smokestick put out by Basic Food Materials, Inc., Dept. I, 806 Broadway, Cleveland 15, Ohio. Sturdily constructed, it is fabricated of tough, carbon-steel rod and spot welded by a "one shot" process, following which it is given three coats of plating, copper, nickel and industrial type chrome. This gives it a smooth, tough, well-wearing finish



Nonporous chromium finish smokestick.

"Trifles make perfection but perfection is no trifle"

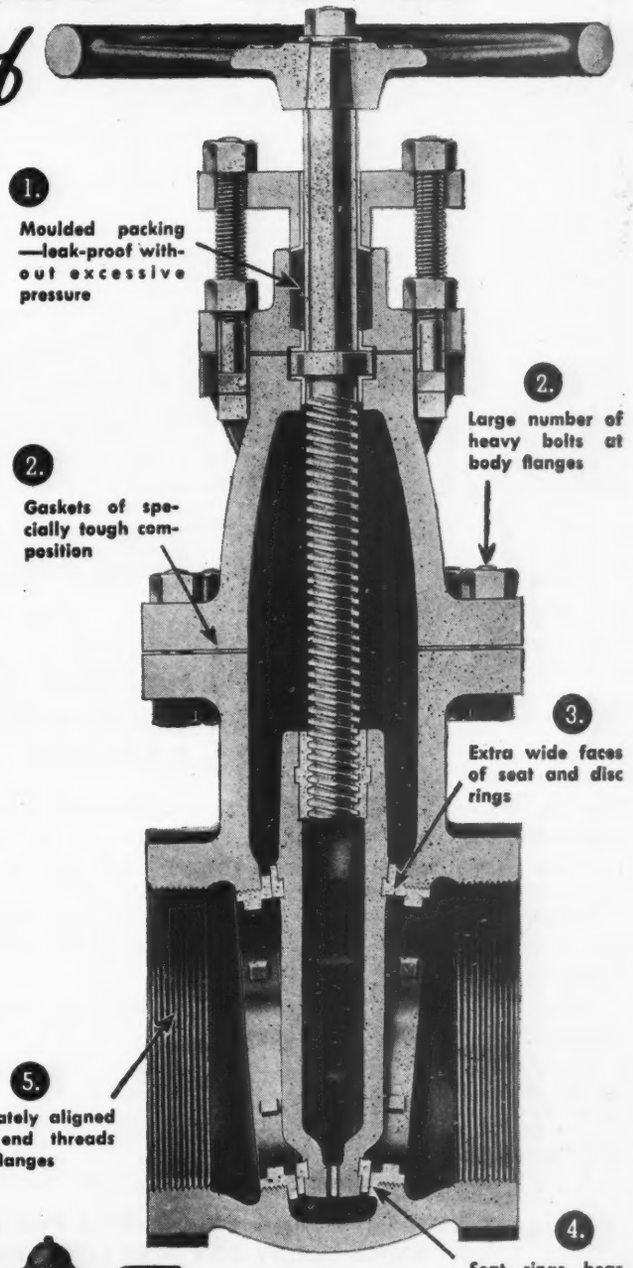
One of a series of advertisements explaining how Kennedy gives careful attention to the details of valve design, construction and workmanship that provide maximum effectiveness, convenience, and length of service.

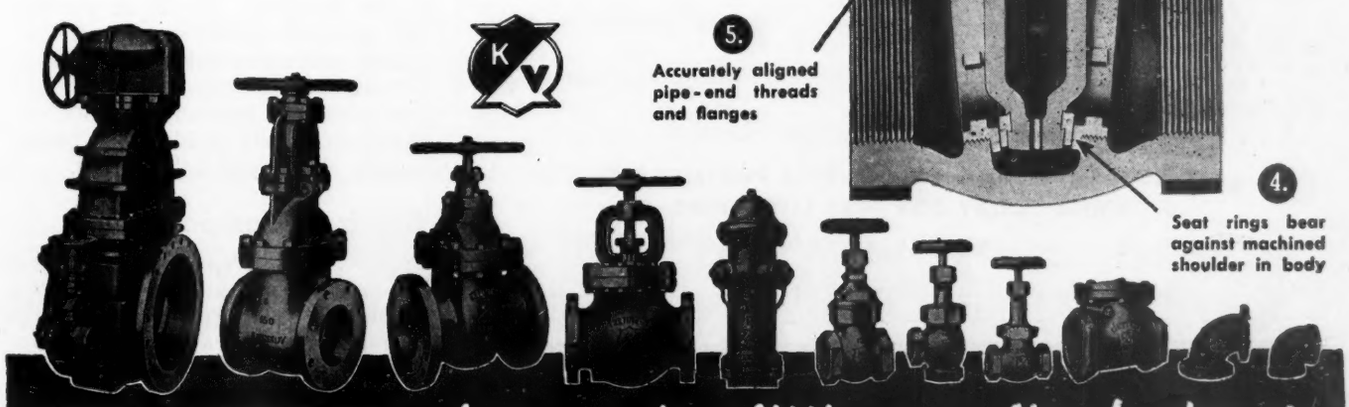
5 Features that make KENNEDY valves lastingly leak-proof

1. LEAK-PROOF at the STUFFING BOX . . . without excessive friction . . . because of accurately fitting glands, stems and bushings with moulded packing.
2. LEAK-PROOF at BODY-BONNET JOINT . . . because of gaskets of specially tough composition and large number of heavy bolts at body flanges.
3. LEAK-PROOF between DISCS and SEATS . . . because of extra wide faces of seat and disc rings, with accurate machine work and rigorous factory tests.
4. LEAK-PROOF between SEATS and BODY . . . because seat rings are securely screwed into body and bear tightly against shoulder in body.
5. LEAK-PROOF at END CONNECTIONS . . . because of accurately aligned pipe and threads and flanges.

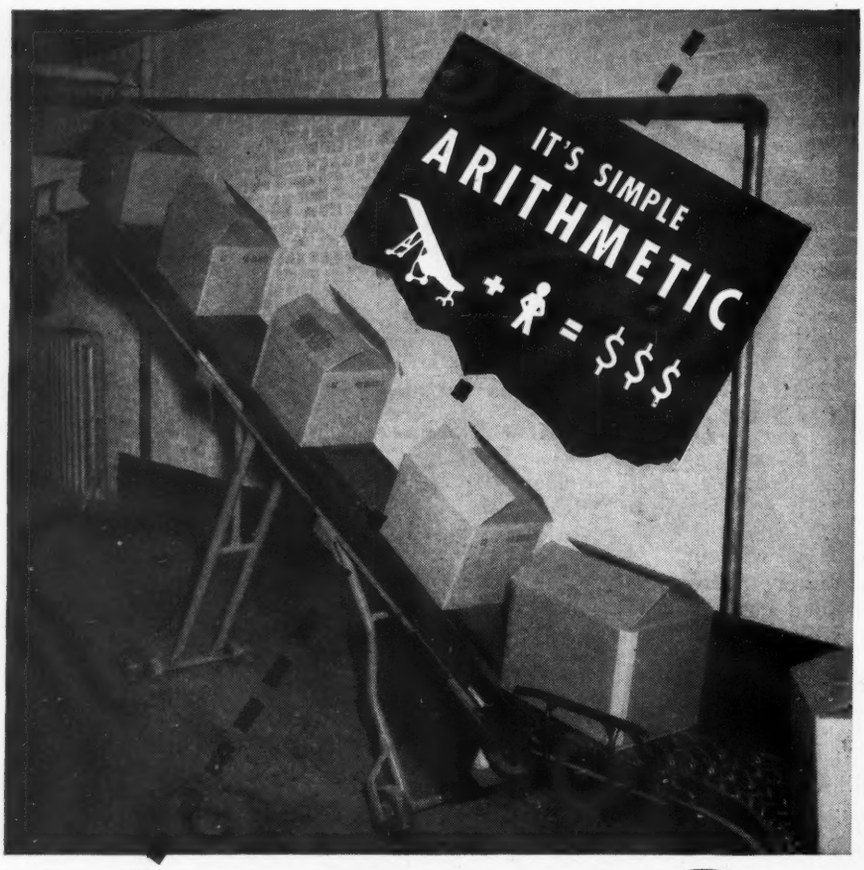
Lasting tightness is but one of the many details to which Kennedy gives extra care . . . and extra value . . . in valve design and construction. The Kennedy Catalog describes all these special features and will help you make a selection for trial. Your copy sent on request.

The Kennedy Valve Mfg. Co.
Elmira • New York





KENNEDY *valves . . . pipe fittings . . . fire hydrants*



THE *Stevedore, Jr.*

ADDS PROFIT
DIVIDES HANDLING TIME
MULTIPLIES MANPOWER
SUBTRACTS FATIGUE

The Stevedore, Jr. plus one man = increased production and more profits.

This combination of a Stevedore, Jr. and one or two men does the work of ten men in less handling time and with less fatigue.

Useful in loading — or unloading — trucks and cars . . . in low stacking operations . . . in a gravity conveyor line as a "booster" or "pusher."

The Stevedore, Jr. — portable, power belt conveyor . . . easily moved from one job to another.

. . . Adjustable Rapid-Lock Supports — from 18" horizontal level to 72" delivery height.

. . . Will lift 225 lbs. of distributed load weight at the rate of 50' per minute.

. . . Plugs into standard 110-volt lighting circuit.

IT COSTS NOTHING TO GET FULL PARTICULARS
WRITE TODAY FOR FREE LITERATURE

OFFICES IN PRINCIPAL CITIES

Manufacturers of
STEEL FORGED CASTERS · TRUCKS · CONVEYORS · POWER BOOSTERS

The Rapids-Standard Co., Inc.

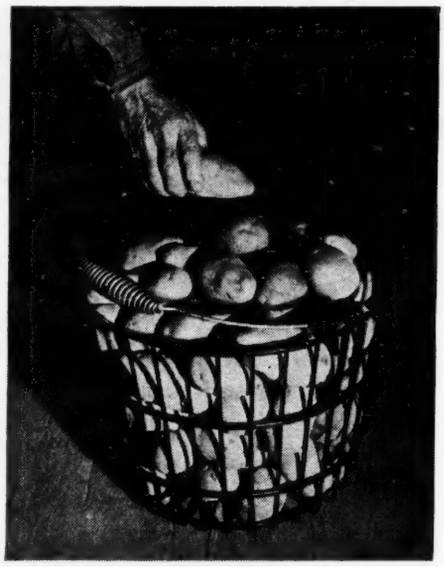
Sales Division—361 Peoples National Bank Bldg., Grand Rapids 2, Michigan

that is nonporous and thus prevents the adherence of grease, filth or bacteria. It is said to withstand bending or twisting out of shape. It has no sharp corners or rough edges to pierce casings.

Engineered on a new three-cornered principle, the manufacturer states that it cannot roll during the smoking operation and yet permits smoke and heat to reach maximum surface, eliminating blind spots caused by imperfect circulation. They further state that it is cleaned readily with hot water but if strong solutions are used, it will not harm the finish. It is available in 42 in. lengths although special sizes up to 48 in. may be secured on request.

Potato Basket

UNITED STATES RUBBER CO., Dept. I, Rockefeller Center, New York, announces a rubber-covered potato basket to safeguard potatoes against bruising. The basket is made of steel



Rubber-covered wire basket.

wire coated with synthetic rubber. The rubber coating performs a double function. While it protects the potatoes from bruising it also affords protection to the wire against corrosion. The open construction of the sides and bottom prevents collection of debris inside. The basket weighs 3¾ lb. and holds ⅝ bu.

Anti-frost Compound

STANCO, INC., Dept. I, New York, has announced the development of a double-duty anti-frost compound for use on freezer doors and refrigerator coils of cold storage plants, freezing rooms and lockers. It is said to prevent the sticking of freezer doors and acts as a sealer on contact surfaces to prevent leakage. It aids in

For Control of INSECT PESTS...
Use
Du Pont
DEENOL
DDT
Insecticides
For "long lasting" control of many common insect pests, use "DEENOL" DDT insecticides especially prepared by Du Pont for commercial and industrial use. Five different preparations—each designed for specific uses—all of them formulated for safe, easy and effective application.
"DEENOL" DDT insecticides give control up to several months, depending upon use.
For a general guide, consult the chart below showing use of "DEENOL" DDT formulations. For detailed information, write for our folder on "DEENOL" DDT. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Del.
Follow this Guide

YOUR PROBLEM	FOR THESE INSECT PESTS				Specially for crawling insects such as cockroaches, ants, bedbugs, ticks, silverfish, lice.
	Flies, ants, gnats, mosquitoes, fleas, ticks, wasps, cockroaches, carpet beetles, moths, silverfish, bedbugs, weevils, cadelle, and other stored product insects.				
YOUR PLACE OF USE	UNDER THESE CONDITIONS				
	On surfaces where *wetting* by water and *visible residue* are not objectionable.	On surfaces where *wetting* by water is not objectionable and *visible residue* is not desired.	On surfaces where *wetting* by water *is* objectionable and *visible residue* is not desired.	For large users who may wish to prepare their own spray mixtures by adding solvents.	On floors and baseboards, in cracks and crevices of woodwork, dark places behind pipes and other places insects infest.
	— USE —	— USE —	— USE —	— USE —	— USE —
YOUR PRODUCT	**DEENOL 50-F** Wettable powder; mix with water, use as spray. DDT—50%.	**DEENOL 25-EM** Emulsifiable oil; dilute with water, use as spray. DDT—25%.	**DEENOL 5-H** Ready-to-use oil spray. DDT—5%.	**DEENOL 25-C** Concentrated oil; dilute with a solvent, use as spray. DDT—25%.	**DEENOL 10-A** Ready-to-use dusting powder. DDT—10%.

DU PONT
REG. U. S. PAT. OFF.

DEENOL
TRADE MARK

DDT
INSECTICIDES FOR INDUSTRIAL USES

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

SEAMLESS

THE ONLY ONE OF ITS KIND IN THE WORLD . .

HUBBERT

STAINLESS STEEL KETTLES FOR 1946

ARE AVAILABLE NOW!

COMPARE

1. Seamless inner and outer shells . . . no welds to crack or corrode.

COMPARE

2. Safe . . . no chance for "blown" inner shells at rated working pressures . . . ample metal thickness.

COMPARE

3. Sanitary . . . no cracks or depressions for dirt to cling to . . . easy to clean and to keep clean, inside and out.

COMPARE

4. Smart appearance . . . 1946 designs. Up to the minute in every respect.

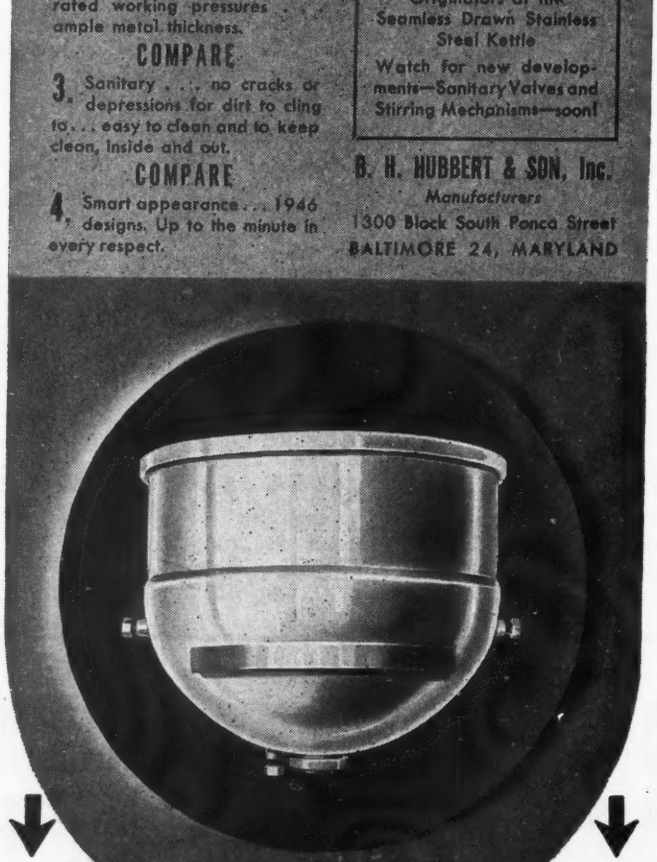
COMPARE

5. Scientifically engineered for efficient cooking and even heat distribution. Proper working height. Perfect all-around performance.

Originators of the Seamless Drawn Stainless Steel Kettle

Watch for new developments—Sanitary Valves and Stirring Mechanisms—soon!

B. H. HUBBERT & SON, Inc.
Manufacturers
1300 Block South Ponca Street
BALTIMORE 24, MARYLAND



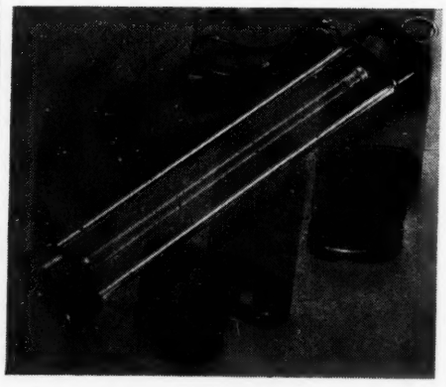
EVERY HUBBERT SEAMLESS DRAWN STAINLESS STEEL KETTLE EVER SOLD IS ON ACTIVE DUTY TODAY

the removal of ice and frost built up on the refrigerator coils.

It is made of a petroleum base, has a light color and a soft consistency. It is applied easily by brush or swab. It is designed for use on metal and the product is said to possess anti-rust properties. In thin films it has an insignificant effect on heat conductivity. Before applying, the contact surfaces are freed from frost, rust, scale and water. One to two pounds of the product usually suffice for treating the contact surfaces of a door in winter and summer, respectively. The frost formation is brushed off as required about once a week. The defrosting may be repeated up to six times before renewal of coating becomes necessary. The product is applied to frost-free pipe at the rate of 1.4 lb. per 100 lin. ft. of 2 in. diameter pipe, leaving a thickness of only 0.005 in. It is available in 35 lb. pails and in 100-lb. kegs.

Germicidal Lamp

SANILITE CO. announces a germicidal lamp designed for showcases and similar locations in which humidity is high. Outstanding feature of the new unit is said to be its absolute immunity to moisture. The ends of the lamp and the ends of the stainless steel tubes that carry



Waterproof germicidal lamp.

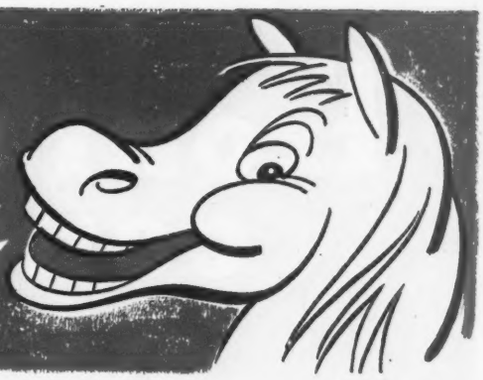
the wires from one end of the lamp to the other are held in fixtures molded from a Durez phenolic plastic. One of these fixtures contains a miniature transformer, the other, an automatic starting mechanism. Both fixtures are packed with a non-hygroscopic dielectric material in which the electrical parts are embedded.

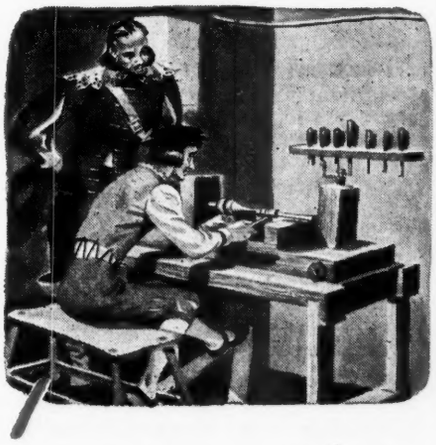
pH Meter

IN introducing its pH meter, Macbeth Corp., Dept. I, 227 W. 17th St., New York 11, states that since no batteries are used, this meter can be left on continuously. It is further claimed that extreme simplicity of

Old Reliable Red Band Says—

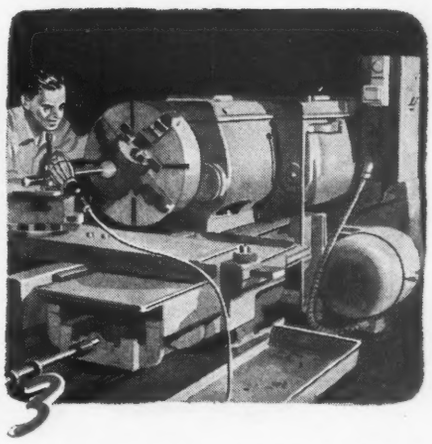
"They used to 'Boot Out' Machine Tools!"





In the early 1600's, machine tools like this for making metal items were considered marvels. They were tricky to use. Foot power replaced laborious hand work. Crude machine tools for making metal items were literally "booted out!"

By accident, in the 1870's, it was discovered that if a direct current dynamo was connected to the current of another, that the first would serve as a motor. This ushered in a new age—the age of utilization of electrical horsepower.



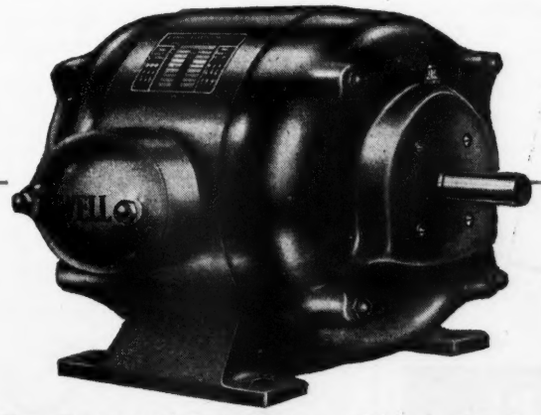
Result: Electrical horsepower replaced foot power! Today, every plant uses from dozens to thousands of electric motors . . . For more than a quarter of a century Howell has specialized in building quality motors for a wide range of industrial uses.

Have you a hard job for horsepower?

Years of specializing in building industrial type motors to meet the exacting requirements of the automotive, machine tool, dairy, food and other industries, have enabled us, we believe, to make Howell Motors better than ever.

Today, as always, Howell Motors are quality-motors. They are smooth operating because they are statically and dynamically balanced. They are better performing because they are built of the finest materials—copper or bronze rotors—and completely insulated. They are trouble-free on the job because they are designed for the toughest tasks in industry—consequently, they perform better on all jobs.

For your needs, in specialized or standard motors, from ¼ to 150 h.p., phone the nearest Howell Representative today. Remember, you pay no more for industrial type Howell Motors . . . but you always get top quality for your money.



Howell Protected Type Motors available in sizes 5 h.p. and smaller. Also other sizes of Howell industrial type motors available up to 150 h.p.

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

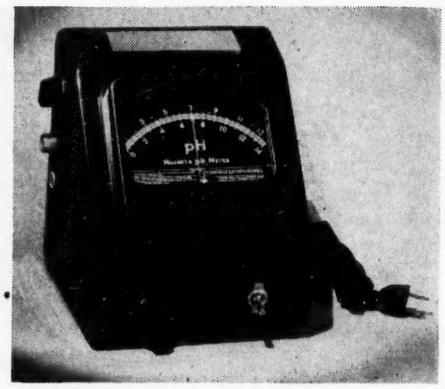
front and center

That is Missouri's position. In FRONT RANK among the nation's most advantageous industrial locations . . . . in the very CENTER of things opportunity-wise.

Consider these vital facts: Over 950 new corporations last year. New modern State Constitution. Low taxes. Unlimited water supply. Wealth of raw material and abundance of firm power. Vast pools of skilled native-born friendly labor. Rich diversified consumer market. Hub of all inland transportation. Extensive cultural and educational facilities. 350 alert communities eager and able to offer every cooperation.

Specialized, confidential service to industrialists. Write direct: Missouri State Department of Resources and Development, Dept. 706, Jefferson City, Missouri.

THE STATE OF MISSOURI
IN THE HEART OF AMERICA



Line-operated pH meter.

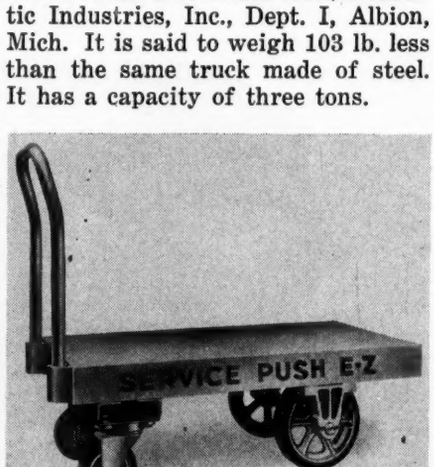
operation adapts the instrument to pH control by workmen, assistant technicians, and chemists. Only one control, in addition to the electrode switch, is used. pH values are read directly on the scale in 0.1 unit over the full range of 0 to 14 pH.

Insect Control Device

POSITIVE, quick, and safe control of all insect pests is said to be assured by a device announced by the Tanglefoot Co., Dept. I, Grand Rapids, Mich. The device is known as the Difusolier. It operates from any light socket, forcibly expelling a mist of insecticide so extremely fine that it is said to penetrate clothing seams, under rugs, behind woodwork. The unit includes an automatic time switch. It is asserted that the quick killing insecticide is harmless to humans, foods, fine fabrics, or pets. The company recommends it for use in commercial establishments, including bakeries, dairies, warehouses, restaurants, and where non-toxicity is of major importance.

Push Truck

AN all-magnesium alloy push truck has been placed on the market by Service Caster & Truck Div., Domestic Industries, Inc., Dept. I, Albion, Mich. It is said to weigh 103 lb. less than the same truck made of steel. It has a capacity of three tons.



All-magnesium alloy truck.

CATALOGS, BULLETINS

This selected information on new publications is offered by FOOD INDUSTRIES Readers' Service through cooperation with the manufacturers. It helps executives save valuable time. To obtain literature described, simply fill in form below, clip it to your letterhead and mail to FOOD INDUSTRIES. There is no cost, no obligation.

Food Plant Equipment

Electrostatic Separation.....1

Ritter Products Corp. has released several bulletins dealing with the electrostatic separation of products. Some types of dry food products are successfully separated by this method.

Electric Motors.....2

Star Electric Motor Co. has released an 8-page, file-size, condensed catalog bulletin that presents specifications and descriptions of standard motors and generators. It also describes their facilities for building special motors.

Acid-Resisting Equipment.....3

Resisto Pipe & Valve Co. has issued a 12-page catalog describing and illustrating acid-resisting valves, pumps and fittings.

Valves 4

Manning, Maxwell & Moore, Inc., announce a release of a catalog dealing with steel weldvalve in gate, globe and angle designs. It illustrates and describes new valves and points out many advantages.

Chocolate Pre-Bottomer.....5

J. W. Greer Co. has released a folder on the pre-bottomer and all-weather refrigerated cold slab for pre-bottoming chocolates. What the unit does, and how it does it, are well described in the text and illustrated in the cuts.

Valves 6

Farris Engineering Co. has issued Catalog No. 45 covering new safety valve designs and improvements in old designs.

Rotameters 7

Fischer & Porter Co. has published an 8-page bulletin No. 45-A, covering the most prominent styles of rotameters and their uses.

Processing Equipment.....8

Equipment for sifting, packing, grinding, flaking and oil recovery are summarized by Allis-Chalmers Mfg. Co. in its latest annual engineering review.

Electric Lift Truck.....9

Automatic Transportation Co. has released catalog on electric propelled lift trucks.

Liquid Cooler.....10

Niagara Blower Co. has issued Bulletin No. 100 describing their liquid cooler that furnishes cooling water, or any aqueous solution, for industrial purposes.

Handling Loads.....11

The Elwell-Parker Electric Co. has issued four bulletins dealing with economical methods of handling various types of loads. They are entitled, "The Logistics of Boxes; of Barrels; of Bags; of Bales."

Flame Cutting Outfit.....12

Victor Equipment Co. has issued a preliminary bulletin on pack-type emergency flame cutting outfits. Originally designed and produced for the Navy, it is now offered to industry.

Control Equipment

Control Equipment.....13

Precision Scientific Company has released a bulletin describing and illustrating vacuum recording and control equipment.

Control Instruments.....14

Taylor Instrument Companies has released a 44-page catalog illustrating by line drawings and photographs many time-proven instrument hook-ups as they apply to blanchers, exhausters, lye peelers, and other food processing equipment where control is necessary.

Boiler Feedwater Control.....15

Northern Equipment Co. has released Bulletin No. 441, dealing with boiler feedwater control for high-duty boilers.

Temperature Control Instruments..16

H-B Instrument Co. has issued a 16-page catalog illustrating and describing temperature control instruments that include relays, thermostats and thermo regulators.

pH Instruments.....17

The Bristol Co. has released a bulletin describing its line of pH control instruments. Engineering and technical information relative to pH theory and measurements is included.

Water Level Controller.....18

Bulletin 445, issued by Northern Equipment Co., tells of controlling water level on 675-psi boiler in an eastern utility plant.

Plant Supplies

Essential Oils and Flavors.....19

Dodge & Olcott, Inc., has issued a catalog covering essential oils, flavors, insecticide concentrates, gums and other basic materials. Included in this catalog is their latest wholesale price list.

Water Softeners.....20

A number of leaflets explaining the principle of water softening and describing equipment they manufacture for this purpose have been issued by Loomis-Manning Filter Mfg. Co.

Silicone Rubber.....21

Dow Corning Corp. has released a pamphlet describing "Silastic," a silicone rubber that is said to be resilient at temperatures up to 500 deg. F. and is flexible at temperatures down to —70 deg. F.

Flooring Material.....22

The Philip Carey Mfg. Co. has released a folder on industrial asphalt flooring used for resurfacing or patching old floors. Simple and clear directions for its use are given.

Insecticides 23

Hercules Powder Co. has published a 34-page booklet on various types and combinations of insecticides. Formulations for the various kinds of toxicants are given, such as (1) for quick knock-down, (2) for residual kill and

Good until June, 1946

FOOD INDUSTRIES READERS' SERVICE

FOOD INDUSTRIES, 330 W. 42nd St., New York City 18

Please have manufacturer send me, without obligation, literature circled below.

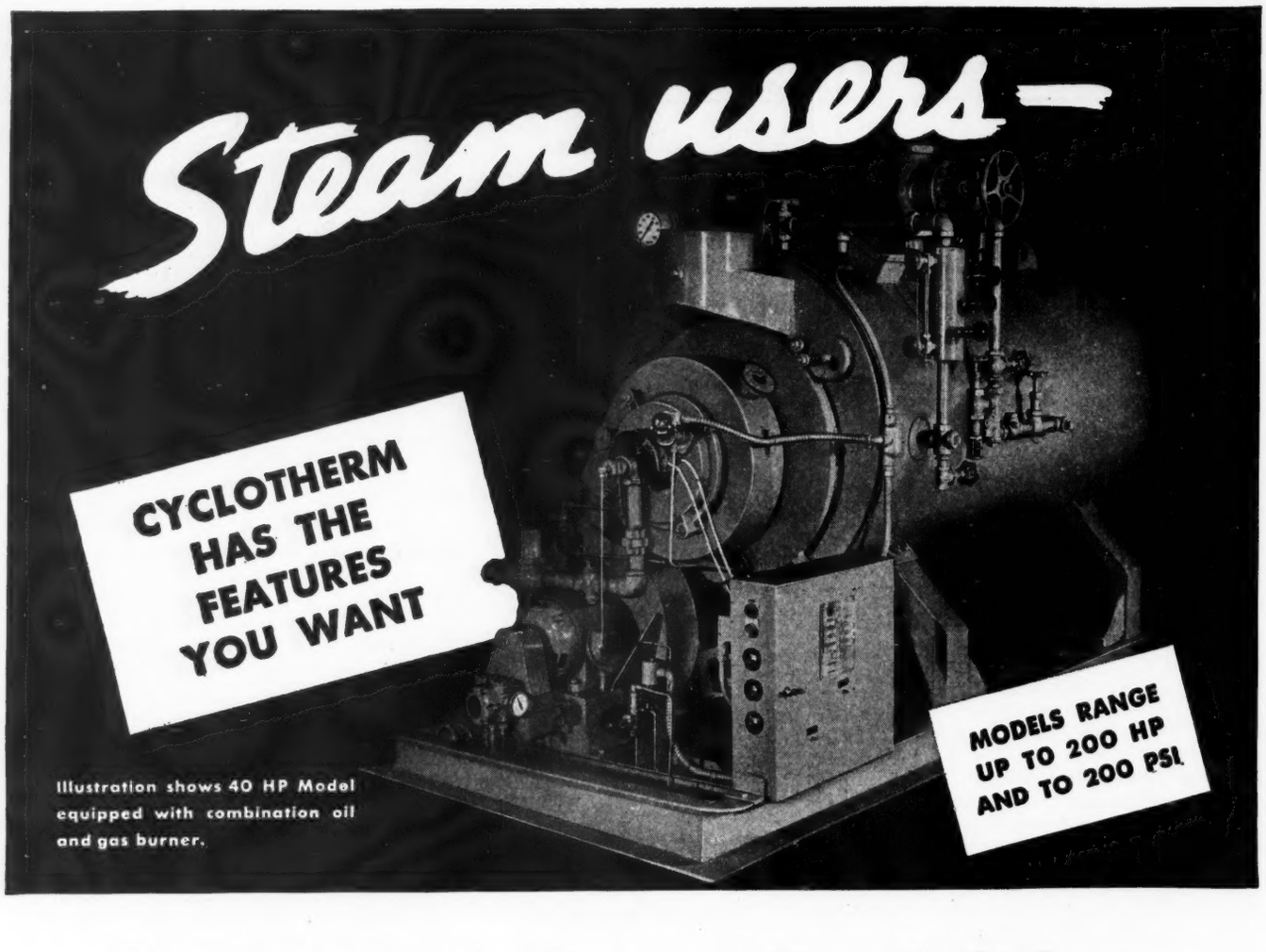
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

NAME..... TITLE.....

FIRM OR AFFILIATION.....

ADDRESS .....

4-46


Steam users—
CYCLOTHERM HAS THE FEATURES YOU WANT
MODELS RANGE UP TO 200 HP AND TO 200 PSI
Illustration shows 40 HP Model equipped with combination oil and gas burner.

Cut your Steam Costs with a Cyclotherm

Steam costs, from fuel to boiler maintenance drop when you install a Cyclotherm Steam Generator.

Cyclotherm's completely automatic operation and exclusive principle of combustion and heat transfer maintain better than 80% operating efficiency, assure thrifty control of fuel consumption and a minimum of operating expense.

Choice of Oil or Gas Firing

In some areas it is desirable to use either oil or gas as fuel. The Cyclotherm model illustrated above is equipped with the Cyclotherm combination gas-oil burner permitting the change-over from one fuel to the other by merely throwing a switch.

Use of Heavy Oil and Wide Range Modulation

Cyclotherm units from 80 to 200HP may be fired with heavy oil. These units may also be equipped with combination burners, firing either heavy oil or gas. Special automatic controls modulate the firing rate from 30% to 100% of fuel load in response to steam demands.

Shipped as Complete Unit

Cyclotherm units are shipped complete with boiler, burner, all accessories and controls assembled; fully piped, wired; test fired and ready to operate on arrival. They are compact and space saving, and require no special base.

Thousands of Cyclotherm Steam Generators have been proved in use by our armed forces all over the world. Their splendid record of efficient performance indicates the engineering "know-how" and stamina built into each unit.

Write, wire or phone for more complete information.

CYCLOTHERM STEAM GENERATORS

CYCLOTHERM CORPORATION, 90 BROAD STREET, BOX 601, NEW YORK 4, N. Y.

(3) for repellancy. Many of the uses such as livestock sprays and pest controls are discussed and illustrated. The more common pests are given individual treatment, with specific recommendations for their extermination.

Stainless Steels.....25

Electric Steel Foundry Co. has released a bulletin on the application of stainless steel in the food processing industries. In it are described and illustrated a number of pieces of equipment in which stainless steel parts are used.

Nickel Alloys Publications.....26

International Nickel Co., Inc.'s revised List "A" of current publications on Nickel Alloy Steels and other nickel plating is now available. Publications offered cover the production, fabrication, properties and uses of nickel alloys for industrial applications.

Miscellaneous

pH Tablets.....24

Coleman Electric Co. has released a pamphlet describing buffer tablets to be used in making pH determinations. The various advantages of using these buffer tablets are described.

Industrial Management.....27

George S. May Company has released a booklet entitled, "20 Years of Trouble." In it are discussed a number of typical cases that the company was instrumental in solving.

Laboratory Drier.....28

Research Equipment Engineers has released a pamphlet in color, illustrating and describing their laboratory spray drier.

Refrigeration Testing.....29

United States Testing Co. has prepared a pamphlet describing their refrigeration testing facilities. Some of the unusual pieces of apparatus used in testing are described, as well as illustrated.

Fence Erection.....30

Wickwire Spencer Steel has released, as an aid for the installation and maintenance of chain link fence, a manual with complete instructions.

Research Consultants.....31

Arthur D. Little, Inc., has issued a well-illustrated brochure that describes their background and function as a consulting laboratory. Their facilities in various branches of research development are covered.

Equipment Linings.....32

Industrial Lining Engineers, Inc., has released a 4-page bulletin describing the type of application that these linings are intended for. A number of corrosion problems, each with its particular type of lining that was successful in that application, are given.

5,000 Refrig. Food Lockers

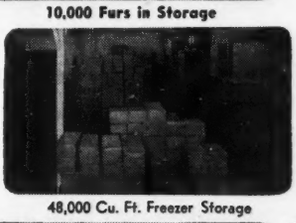
This COMMUNITY REFRIGERATION CENTER Serves Over 15,000 Customers

10,000 Furs in Storage

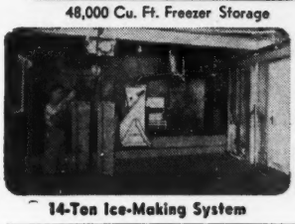
Pat Denham's model plant, covering an entire block at Oklahoma City, provides ten distinct services: it has the world's largest food-locker system, safekeeps 10,000 furs, operates a general freezer storage, makes crystal-clear ice, processes all kinds of foods, does quick-freezing, sells frozen foods, runs a restaurant, has a gas station, and includes a big laundry. Frick refrigerating, ice-making, and air conditioning equipment carries all the cooling loads.

Bulletin 126 tells how any town or city can profit from a similar COMMUNITY REFRIGERATION CENTER. Write for your copy now.

FRICK COMPANY, Waynesboro, Pa.



48,000 Cu. Ft. Freezer Storage



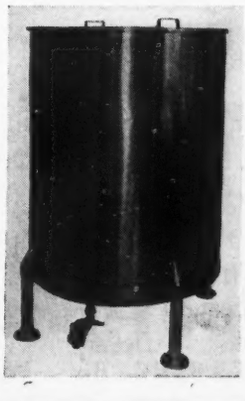
14-Ton Ice-Making System

Air Conditioned Sales Room

Restaurant Service

STABILIZERS
WATER SOLUBLE GUMS
TRAGACANTH • LOCUST (CAROB) • ARABIC • KARAYA
IRISH MOSS
QUALITY CONTROLLED FOR UNIFORMITY IN YOUR PRODUCT

S. B. PENICK & COMPANY
50 Church Street, New York 7, N. Y. Telephone: COrtlandt 7-1970
735 W. Division St., Chicago 10, Ill. Telephone: MOHawk 5651



STAINLESS STEEL TANKS
ARE NOW AVAILABLE

35, 60, 100, 160, 200, 300, 400 and 500 gallon sizes

TERRISS Standard Tanks are made from 18-8 Stainless Steel. They are highly polished inside and outside with a No. 4 finish, pitched bottom and self-draining, and are furnished complete with Stainless Steel Covers. The stands are pipe leg type. Built-in agitators can be supplied for either fast or slow speed. We also build tanks to your specifications.

Seamless Stainless Steel Pails available now.

CONSOLIDATED SIPHON SUPPLY COMPANY, Inc.
22-24 Wooster St., Dept. F, New York 13, N. Y.

Why . . your New Equipment should be made from

Stainless Steel

Stainless steel equipment assures "Grade A" protection through all steps of dairy operation. In tanks, refrigerators, table tops, piping, valves, pasteurizers and filters, the hard, mirror-smooth surface of stainless steel is easy to keep spotlessly clean and free from bacteria. The rustless surface of stainless steel successfully resists corrosive acids, even those in buttermilk. High temperatures will not affect it. There is nothing in stainless that can crack, splinter, or chip off — the surface stays permanently bright. Nor will stainless surfaces affect the flavor or color of dairy products.

Stainless in every form is easy to get from INDUSTRIAL STEELS, INC.

A complete stock of all types and forms of stainless steel is as near as your telephone. INDUSTRIAL STEELS, INC. maintains America's largest warehouse stock of stainless steel hardware, sanitary fittings, shapes, and other parts. Your order can be filled completely and promptly through one telephone call. You pay no premium for this service—for all stock is listed at mill prices.

JMLCo. CI-B2

For Stainless . . .

BARS · VALVES · PLATES · FITTINGS
SHEET · WIRE · HARDWARE · WELDING ELECTRODES

Call *INDUSTRIAL STEELS, INC.*

Engineers, Purchasing Agents, and Designers—Ask to have your name put on the mailing list for the weekly stock list published by INDUSTRIAL STEELS, INC. Lists all types and forms available for immediate delivery.

Everything in STAINLESS

INDUSTRIAL STEELS, INC.

255 BENT STREET
Cambridge 41, Massachusetts

TROwbridge 7000
Teletype: Cambridge 547

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

FERMENTATION

Helped by Nutrients

ADDITION of nutrient materials, such as ammonium carbonate or distillers' malt, accelerate the fermentation of sweetened orange juice, and produce a wine with superior aroma and taste to that made from the sweetened juice alone.

Experiments were carried out at the U. S. Citrus Products Station, Winter Haven, Florida, in which ammonium carbonate or distillers' malt, was added to Valencia orange juice to which sucrose had been added. Ammonium carbonate was added at the rate of 0.9 g. per liter. When malt was used, it was made into a slurry and a sufficient amount added to bring the malt content of the must to between 0.5 and 0.75 percent. The samples were inoculated with yeast and fermentation carried out at room temperatures. Curves are given showing evolution of carbon dioxide, which corresponds directly with increase in alcohol. During the period of maximum fermentation activity the rate of fermentation was greater in the must containing the added nutrient. Organoleptic tests showed that the musts, to which nutrients had been added, produced a wine having an aroma and taste superior to that produced by the controls.

Digest from "Fermentation of Orange Juice as Affected by the Addition of Nitrogenous Nutrients," by A. J. Nolte, *Govt. Document* AIC-79.

FOOD CHEMISTRY

Starch Broken Down

AMYLOSE and amylopectin components of starch may be separated by the use of thymol as the precipitant in a new method which it is claimed avoids the difficulties of the Schock method.

The starch is creamed in cold water and then poured into boiling water with vigorous mechanical stirring. Stirring is continued at the boiling temperature for one-half hour, sodium chloride is added to make a 0.1 percent solution and the solution is cooled rapidly to room temperature. Concentration of starch should not exceed three percent. Powdered thymol is stirred into the liquid in such amount as to insure complete saturation. In a short time, the thymolamylose complex begins to separate. Precipitation is complete in 48 hours. It is removed by centrifuging; is washed rapidly with (1) water saturated with thymol, (2) absolute alcohol and (3) ether, then dried in a vacuum.

The amylopectin component is obtained from the mother liquor by concentrating to one-fourth its original volume and treating with an equal volume of methyl alcohol at 140 deg. F. The precipitate is washed and dried with alcohol and ether.

Digest from "A New Method for the Separation of the Amylose and Amylopectin Components of Starch," by W. N. Haworth, S. Peat and P. E. Sagrott, *Nature*, vol. 157, 19, Jan. 5, 1946.

BAKING

Aging Wheat Improves Baked Goods

CRACKERS and cookies, baked from flours made from partially aged soft wheat, are superior in quality to those baked from flours from fresh harvested wheat.

Two series of newly harvested soft winter wheats, one from Michigan and one from Ohio, were studied to determine the effect of storage upon the viscosity of flours milled from them. A portion of each lot was milled shortly after harvesting, while the balance was stored for several weeks before milling. The apparent viscosity of the flours milled from the freshly harvested wheats, as determined by the no-time and one-hour digestion procedures, increased from 3 to 8 deg. MacMichael, after storage from two to six weeks. The apparent viscosities of flours milled several weeks later from the same wheats was higher and showed less change after storage.

Crackers baked from flours milled from freshly harvested wheats were classed as being mealy, a characteristic that is assocated with greater breakage loss in handling and shipping. The crackers in which the sponge and dough flours were milled from partially aged new-crop wheat, were of superior quality. New-crop flour gave cookies of poorer eating quality than the standard old-crop flours with which they were compared, and the spread factor was higher with cookies made from flour milled from new-crop aged wheat than with those baked from flours milled from newly harvested wheats.

Digest from "Changes in the Viscosity and Baking Properties of Soft Wheat Flours Milled from New Crop Wheats Upon Storage," by W. H. Hanson, *Transactions American Association of Cereal Chemists*, vol. 4, 33-36, January, 1946.

DAIRY

Pasteurized Milk

MILK, pasteurized by a short-time high-temperature process, in which the creaming properties, as well as the flavor of the milk is unimpaired and in which all disease-producing bacteria and a maximum of other types are destroyed, is covered by a recent patent.

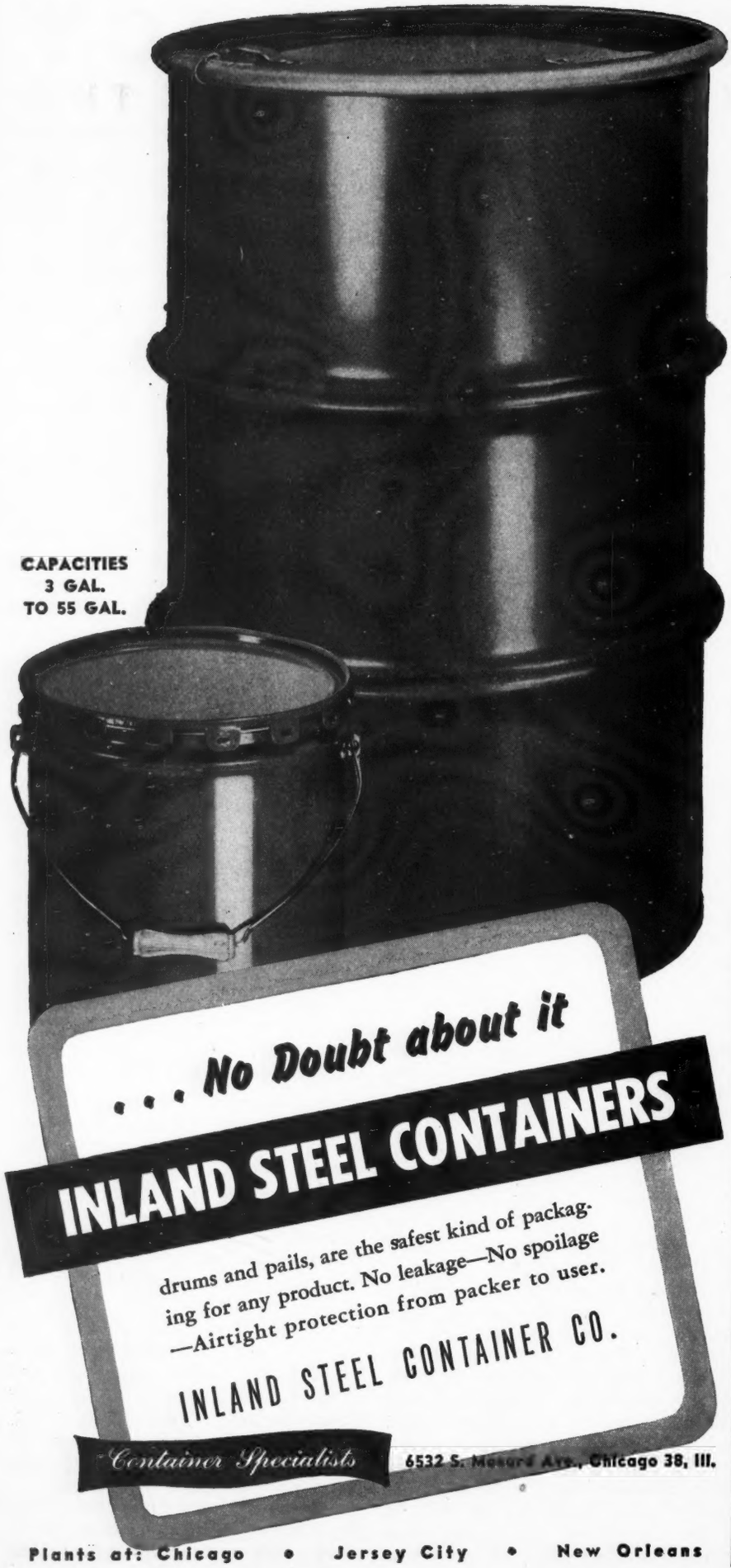
Raw milk is heated to 140 deg. F., by any conventional method, then from 140 to 170 deg. F. within 10 seconds and promptly cooled to 140 deg. F. in approximately 5 seconds. The entire heating and cooling period must not exceed 20 seconds. It may be successfully practiced in various types of commercial equipment, such as "plate" type heat exchangers or the "internal tube" type heat exchangers. It is claimed that the enzyme phosphatase is inactivated and the *Escherichia coli* is destroyed.

Digest from U. S. Patent 2,390,872, issued Dec. 11, 1945, on an application dated Nov. 4, 1940, to A. C. Dahlberg and R. F. Holland, and assigned to Cherry-Burrell Corp., Chicago, Ill.

Flavor in Dried Milk

DRIED WHOLE MILK, exposed to sunlight, develops "sunlight flavor" at a rapid rate—skim milk powder very slowly. To evaluate the effect of light on milk powders, samples of spray-dried powders containing 1 and 26 percent fat, respectively, were exposed to sunlight at 43 deg. F. and to ultra-violet at 100 deg. F. and scored for palatability.

Samples of whole milk powder exposed to sunlight deteriorated more rapidly than control samples; in 215 hours palatability scores decreased from six to one (fresh milk equals 10). Difference between samples exposed to ultra-violet and controls were 1.5 units. Low fat powder did not deteriorate markedly except under light of greatest intensity, while whole milk powder was affected by


CAPACITIES
3 GAL.
TO 55 GAL.
. . . No Doubt about it
INLAND STEEL CONTAINERS
drums and pails, are the safest kind of packaging for any product. No leakage—No spoilage
—Airtight protection from packer to user.
INLAND STEEL CONTAINER CO.
Container Specialists
6532 S. Mason Ave., Chicago 38, Ill.
Plants at: Chicago • Jersey City • New Orleans

light of the lowest intensity used. Deterioration of powder with one percent fat indicates that other components than fat are affected by sunlight.

Digest from "Dried Milk Powder, III. The Effect of Light on Keeping Quality," by Jesse A. Pearce and W. A. Bryer, *Canadian Journal of Research*, vol. 23F, 334-339, November, 1945.

DEHYDRATION

Dried Tomato Product

A NEW and improved type of dried tomato product, which retains its original flavor and does not become hygroscopic so as to cake or form lumps which would interfere with its dispersion in water for soup purposes, has been patented recently. Raw or cooked tomato juice, in the presence of a finely divided edible carbodydrate and a stable edible oil, or a water soluble edible salt of pectic acid, or both, is dried in a spray drier of the type used for making powdered milk. The drying and separation of the product should be effected in such a way that there is an instantaneous drop in temperature, preferably over 100 deg. F., from the drying zone of the upper part of the cyclone to the bottom of the cyclone separator.

It is claimed that the products may be stored and shipped, and will retain their flavor and physical properties, including appearance, over long periods of time. Furthermore, they apparently do not tend to deteriorate or undergo chemical changes due to oxidation or other factors.

Digest from U. S. Patent 2,392,241, issued January 1, 1946, on an application dated May 14, 1941, to E. F. Glabe, and assigned to Stein, Hall & Co., Inc., New York, N. Y.

Changes in Dried Eggs

DEVELOPMENT of off-flavors, loss of solubility, loss of whipping power, and other deteriorative changes of dried eggs are connected with reactions between the glucose and amino groups of the egg proteins. During storage of dried eggs, both whole eggs and whites, at 88 deg. F. for 14 days, there was a parallel loss of glucose and solubility.

The glucose loss is due to a condensation between the reducing group of the glucose and free amino groups of the egg protein. The first compounds formed by the reaction are soluble and further reaction with the protein is necessary before the latter becomes insoluble. By using glucose compounds in which the hydroxyl groups were blocked for the reaction, it was shown that only the reducing group of the sugar is con-

HOMEMAKERS VOTE 2 to 1 FOR COFFEE PACKED IN GLASS!

Among the housewives of America the preferred package for coffee is glass.

The emphatic 2 to 1 vote in favor of glass for coffee packaging was shown in a recent nation-wide survey made by a noted public opinion analyst.*

Here are some of the reasons women give for preferring coffee in glass:

PROTECTION

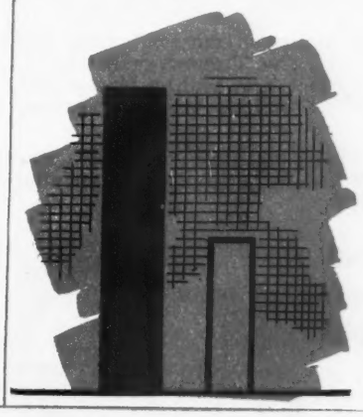
Vacuum-packing delivers coffee roaster-fresh. Cap guards peak flavor, aroma—*reseals* between uses.

ATTRACTIVENESS

Glass packages can be easily arranged in eye-catching displays...add spic and span sparkle to pantry shelves.

VISIBILITY

Glass shows off the rich brown color . . . the size of the grind. Housewives can see when to buy more.



PREFERENCE

Glass is way out ahead as the favorite coffee container. Its popularity is increasing for its advantages are basic!

A Duraglas coffee container has important Duraglas technique advantages—light weight, compactness, strength. It's no wonder so many retailers say: "Glass-packed products require less selling time."

* Name supplied upon request

ESPECIALLY IN Duraglas CONTAINERS

TRADE MARK REG. U.S. PAT. OFF.

OWENS-ILLINOIS GLASS COMPANY · TOLEDO 1, OHIO · *Branches in Principal Cities*

OVER the TEA CUPS—

"What a Smart Way to Package Tea"

Imagine individual tea packets heat-sealed instead of sewed, in fast brewing porous paper that makes a crystal clear cup of tea without siftings even when filled with finely cut tea. They are neat and attractive, produced at high speed and very low cost.

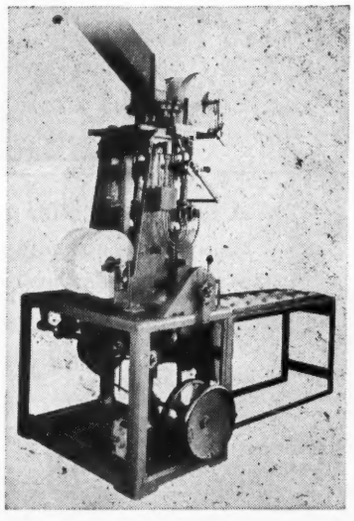
That exactly describes the new convenient tea bag, turned out at the rate of 100 or more per minute on an adaptation of the S & S Transwrap Machine.

Using rolls of tough, porous, heat-sealing paper of high wet strength, especially adapted for the purpose, the tea bags are formed, filled, heat-sealed and stacked in piles of eight, ten or other desired count on a conveyor belt, so that just one packer can easily carton the entire production of the machine.

This process requires only minimum material, time and labor and is a typical S & S Transwrap job. The Transwrap Machine can be used for many other products, using other heat-sealing films—Cellophane, Pliofilm, foil, etc.—from the roll, with various types of feeding mechanisms to suit different products.

There is an S & S machine for packaging your product rapidly and at low cost. Call Stokes & Smith Co. for engineering consultation at any time . . . there's no obligation.

SEE THIS MACHINE IN OPERATION AT THE PACKAGING EXPOSITION, ATLANTIC CITY, N. J. APRIL 2 to 5, BOOTH No. 401



STOKES & SMITH Co

4911 SUMMERDALE AVE., PHILA. 24, PENNA.

FILLING • PACKAGING • WRAPPING • MACHINES

Speeds to suit your needs • 15-30-60-120 per. min.

"Better machines for better packages"

cerned in the loss of solubility of dried eggs.

Sucrose and lactose prevent the loss of solubility by preventing the secondary reaction. Alanine and glycine also reduce the solubility loss, probably because the glucose combines with the amino acids in preference to the egg amino groups.

The sugar-amine reaction explains the pH drop that accompanies the solubility loss, since an increase in free acidic groups results. By fermenting out the sugar before drying the eggs, they are known to keep longer in the dry form. The possibility of finding compounds reacting with glucose preferentially without giving off flavors also exists. These compounds are being investigated.

Digest of "Dried Egg X. The Nature of the Reactions Leading to Loss of Solubility of Dried Egg Products," by E. C. Bate-Smith and J. P. Hawthorne, *Journal of the Society of Chemical Industry*, vol. 64, 297-302, November, 1945.

MICROBIOLOGY

Propionate as a Germicide

SODIUM PROPIONATE is most effective as a bacteriostatic and mycostatic agent when in acid media. Yeasts of the *Saccharomyces cerevisiae* type are more tolerant at pH 3.5 than any of 7 bacteria, 3 yeasts and 2 molds tested. A species of *Torula* yeast from spoiled fruit was not inhibited by a 5 percent solution of sodium propionate at pH 7.0; but treatment with a 0.1 percent solution at pH 3.5 prevented its growth effectively.

Digest from "Effect of Sodium Propionate on Microorganisms," by E. R. Wolford. *Journal of Bacteriology*, vol. 50, 235, 1945.

CANNING

Treating Tomato Juice

A PATENT has been granted for an improved method and apparatus adapted to receive tomato juice from the extractor, salt it, inactivate the enzymes, pasteurize or sterilize the juice, deaerate it, and reduce the temperature of the juice, but deliver it while still hot to the filling machine, all in a continuous process.

According to the invention, tomatoes are crushed at room temperature, and granular salt, in predetermined quantities, is added to the juice. The juice is promptly delivered to a heat exchanger in which it is quickly brought to a temperature in excess of its boiling point, and held for a time sufficient to destroy the enzymes and kill the bacteria. At the end of the steriliz-

(*Turn to page* 198)

"1946 outlook for nutrition

So states a Department of Agriculture Bulletin with a warning, however, that "diets of many families in the *lower income groups are particularly in need of improvement.*"

"We not only maintained our nutrition level during the war, but we were able to improve our position considerably."

This statement is taken from a recent bulletin issued by the U. S. Department of Agriculture.

The same bulletin continues:

"From information obtained in 1936 on the quantities of food consumed by a large sample of families, we concluded that one-third of the people in the United States had poor diets. Scattered studies since then have indicated considerable improvement in the dietary pattern, but particularly *for the low-income groups we know that much improvement is still needed.*"

"Because the diets of many families in the lower income groups are particularly in need of improvement, it is important from the nutritionist's viewpoint—as well as from the agriculturist's—that *all measures leading toward more adequate food for the lower income group be emphasized in the years ahead.*"

It is this low-income group which is less able to buy all the *natural* nutritious foods they need. If more of the foods they *do* buy regularly were nutritionally improved—then these families would *automatically* obtain better nutritional help.

Standard Brands Incorporated has spent much time and research in recent years, developing products for Vitamin B complex, Vitamin D, and protein supplementation of foods. These products are known for their dependability and uniformity.

If you are now seeking ways of fortifying your company's products, we invite you to discuss your needs in confidence with one of our executives.

Products containing

VITAMIN D

Fleischmann's Hy-Dee
Irradiated Dry Yeast

Fleischmann's Irradiated Dry Yeast
Type 700-H

Standard Brands Viosterol
(Activated Ergosterol) Steenbock Process

Products containing

NATURAL B COMPLEX FACTORS

Fleischmann's
Pure Dry Primary Yeasts *(Brewer's Strain)*

Fleischmann's
Bee-Flex Products

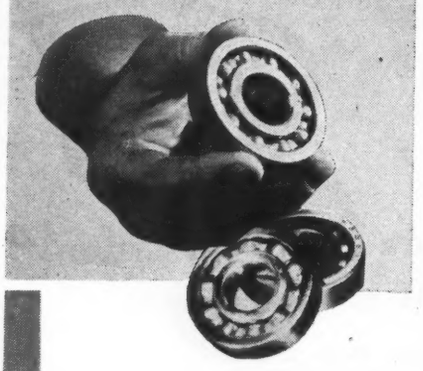
Fleischmann's
Brewer's Yeast Extract Types 3 and 41

Fleischmann's
Yeast Extract and Liver

STANDARD BRANDS INCORPORATED

Pharmaceutical Division • 595 Madison Avenue • New York 22, N. Y.

MAKE ONE BEARING
OUTLIVE TWO!



LUBRIPLATE Lubricants actually condition bearing surfaces and stop progressive wear. They prevent rust and corrosion and resist steam, hot water, many acids and other adverse conditions. LUBRIPLATE is in a class by itself. Use it and make one bearing outlive two. Write or phone for facts and figures.

℞ FOR YOUR MACHINERY

No. 3 — Ideal for general oil type lubrication, ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8 — Because of high film strength and long life it reflects outstanding performance in most types of enclosed gears (speed reducers).

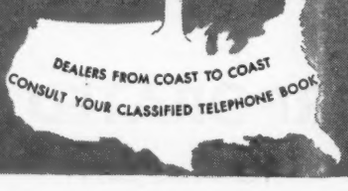
No. 107 — One of the most popular grease type products for general application by pressure gun or cups.

No. 70 — For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA — Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING — This is the LUBRIPLATE Lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J. TOLEDO 3, OHIO



ing period the juice is reduced in temperature to slightly above 212 deg. F. by passing it through a heat exchanger, then fed into a deaerator. The juice may drop a few degrees in the deaerator but should be packaged at a temperature above 200 deg. F. The entire system, when once started, is automatic and self-operating. Salting is done automatically, and it is claimed that the salt content of the juice is maintained more accurately than in the case of conventional methods. The salting does not contaminate the juice inasmuch as the juice is sterilized after it is salted. Due to the recirculation of the juice through the heat exchanger, no juice can pass to the filling machine until it has received the full treatment.

Digest from U. S. Patent 2,392,197, issued January 1, 1946, on an application dated July 30, 1941, to H. L. Smith, Jr., W. E. Conley, Jr., and W. L. Atwood, and assigned to Chain Belt Co., Milwaukee, Wis.

MEATS

Thawing Temperatures

METHODS of thawing frozen sides of pork, to be used for Canadian Wiltshire bacon, seem to have no systematic influence on color, quality, or brightness of the cured bacon. Lower bacteria counts and a saltier product resulted from defrosting at 70 deg. F.

Sides of pork were frozen at —15 deg. F. for 24 hours, and subsequently stored at 0 deg. F. They were thawed at 40, 55 and 70 deg. F. in dry and moist air, the sides being wrapped and unwrapped in different trials, in water, in curing pickle, and in 5, 15 and 30 percent brine. Thawing in all liquid media occured at approximately the same rate. After curing there was little difference in weight. Higher thawing temperatures gave a saltier product. Bacteria counts were lowest when defrosting was done at 70 deg. F. in water, curing pickle or concentrated brines and highest in water at 40 deg. F. Defrosting methods had no systematic influence on color, quality or brightness.

Digest from "Canadian Wiltshire Bacon XXVII. Effect of Method of Thawing Frozen Pork on Bacon Quality," by W. Harold White, G. A. Grant, and N. E. Gibbons. *Canadian Journal of Research*, vol 23F, 363-372, November, 1945.

Salts Prevent Bleaching

BLEACHING of ground meat products, such as sausage, meat loaf and hamburger steak, is prevented by the addition of a buffer salt in a strong solution of water to dry seasoning compositions containing oleoresin of

CASE HISTORY No. 4

In a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

	100 lb. Open-Mouth Fabric Bags	100 lb. Multiwall Paper Valve Bags
Bag cost per M	170.00	92.66
Bag cost per 100 lbs.	.1700	.0927
Labor cost per 100 lbs.	.0029	.0024
Total bag and labor cost per 100 lbs.	.1729	.0951
Saving per bag, paper over cotton		.0776
Saving per ton, paper over cotton		1.56

DETAILS OF LABOR COSTS

	Production per hour	Cost per 100 lbs.
Fabric Bags		
4 men packing and closing at 95¢ per hour	132,000 lbs.	.0029
Multiwall Paper Valve Bags		
4 men operating packers at 95¢ per hour	156,000 lbs.	.0024

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD ✓
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR ✓
CORROSIVE ✓	HEAVY
DELIQUESCENT	HYGROSCOPIC ✓
FLUFFY	LIGHT
FREE-FLOWING ✓	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speed, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator.

St. REGIS PACKAGING SYSTEMS

prove their worth . . . in SALT

This fourth case history, in a series of MULTIWALL success stories, relates the experiences of one of the leading American salt refining companies. The multiple problems of caking, contamination, and absorption of odor were solved and economy in packaging was effected after consultation with St. Regis field engineers. As a result, this large salt refinery has been a satisfied user of Multiwall Paper Bags and St. Regis Valve Bag Packers for over ten years.

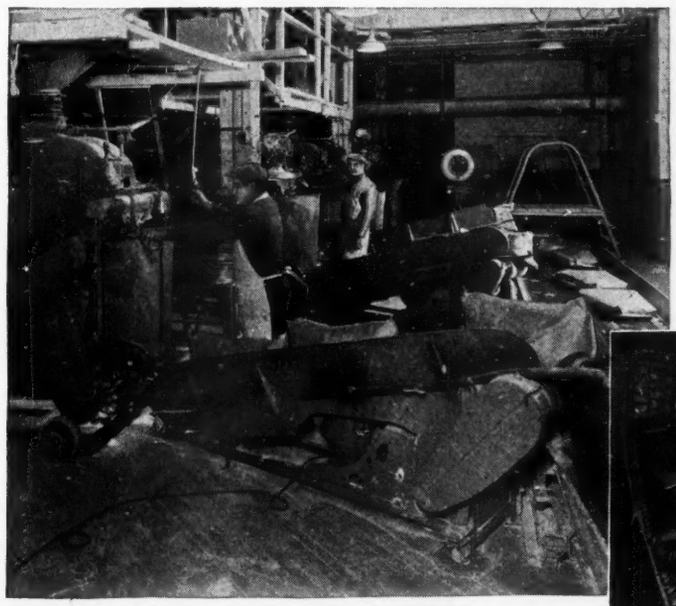
PROTECTION: The multiple layers of kraft paper combined with a moisture proof sheet prevent penetration of water and atmospheric moisture and keep the salt clean and free from caking. No longer is there any problem of lint and dirt in the salt.

REDUCED CONTAINER COSTS: A 46 per cent saving in bag cost has been made by using Multiwall Paper Bags instead of fabric bags.

INCREASED PRODUCTION: An increase of 18 per cent per hour in packaging output, with the same crew, was made possible through use of Multiwall Paper Bags and St. Regis Valve Bag Packers.

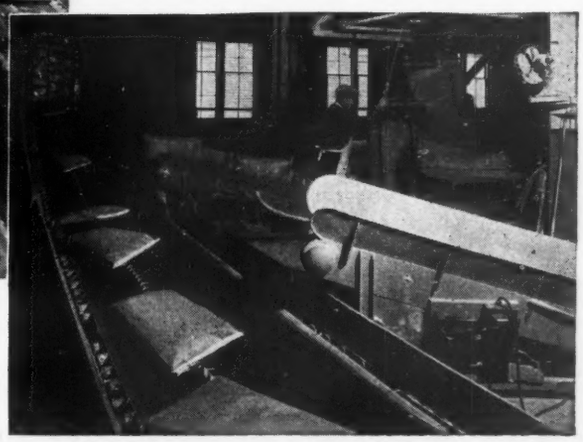
EASIER HANDLING: Small portable conveyors running from each of the valve bag filling machines deliver the 100-lb. bags to a large master conveyor on which they ride to the shipping room.

CONSUMER PREFERENCE: Customers express satisfaction with the Multiwall Bag because it protects the product in transit and while stored and eliminates the danger of the salt absorbing odors from other commodities.



Left: *Operators filling 100-lb. Multiwall paper bags using St. Regis Valve Bag Packers. Machine deposits filled bags on small portable conveyors.*

Below: *From small conveyors illustrated on left filled bags are delivered to this master conveyor which delivers the 100-lb. bags to the shipping room.*



MULTIWALL

ST. REGIS SALES CORPORATION

(Sales Subsidiary of St. Regis Paper Company)

NEW YORK 17: 230 Park Ave. **CHICAGO 1:** 230 No. Michigan Ave.
BALTIMORE 2: 2601 O'Sullivan Bldg. **SAN FRANCISCO 4:** 1 Montgomery St.

Mail this coupon for the complete story

Birmingham Boston Cleveland Dallas Denver
Detroit Franklin, Va. Los Angeles Nazareth, Pa.
New Orleans No. Kansas City, Mo. Ocala, Fla. Seattle Toledo

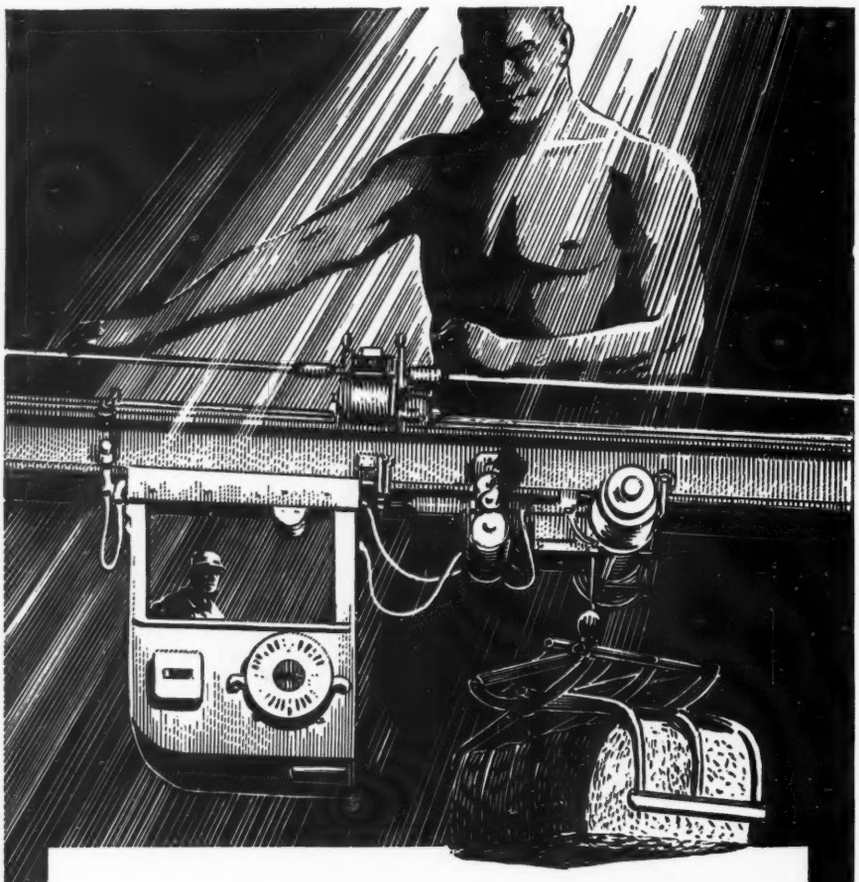
IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal, Vancouver.

Without obligation, please send me full details regarding "Case History" No. 4, outlined above.

NAME_____

COMPANY_____

ADDRESS_____



BUILT FOR TOUGH JOBS!

• The invisible strength of this mighty giant lifts and places heavy loads at your command.

The rugged construction of Shepard Niles Single Beam Cranes assures added handling economy resulting in extra value in terms of production economy. Shepard Niles Cranes are made tough and durable to give long, dependable service. They are made in many types, capacities and spans to fit your particular need.

To meet competitive production schedules — to maintain smooth-flowing production lines, material handling equipment must stand up under severe operating conditions. You'll get capacity load-handling, long efficient service at low maintenance cost with a Shepard Niles Hoist.

Shepard Niles
CRANE & HOIST CORPORATION

Improve your competitive position in the industrial world. A request will bring you full data and tell you how you can put a Shepard Niles Crane to efficient use in your factory.

422 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

capsicum and solid edible carriers, such as sodium chloride, corn sugar, or certain other sugars, not cane sugar, is the claim in a recent patent. The buffer salt is a normal or acid salt of potassium, sodium or ammonia capable of action with acid in the composition to render acidity substantially non-effective to produce early bleaching.

To avoid caking of the dry seasoning composition, due to the water in the buffer solution, a suitable liquid hygroscopic agent such as glycerine, is added.

The patentee claims that the use of this method permits less buffer salt to be as effective as, or more effective than, a corresponding amount of the buffer salt in dry powdered form.

Digest from U. S. Patent 2,385,412, issued Sept. 25, 1945, on an application dated May 3, 1943, to L. A. Hall, and assigned to The Griffith Laboratories, Inc., Chicago, Ill.

CEREAL PRODUCTS

Caffein Extraction

DECAFFEINATING coffee and recovery of the caffein by the use of two or more solvents and adsorbent clay, with a savings of about 65 percent in heat requirement, is the subject of an invention recently patented.

In the process, the caffein is extracted from the coffee beans by a chlorinated organic solvent of relatively low polarity. The caffein is adsorbed from the solvent on clay and desorbed from the clay by a non-chlorinated organic solvent of relatively high polarity, or a mixture of solvents containing at least one non-chlorinated organic solvent of relatively high polarity. Caffein is recovered from the second solvent by distillation. Variations in the patent permit the use of an azeotropic mixture of the chlorinated and non-chlorinated organic solvents for desorption.

Digest from U. S. Patent 2,391,981, issued January 1, 1946, on an application dated January 12, 1943, to R. E. Kremers, and assigned to General Foods Corp., New York, N. Y.

PACKAGING

Testing Filled Sealed Cans for Leaks

A METHOD of testing filled sealed metal cans, containing products such as dried whole or skim milk, which are capable of absorbing carbon dioxide gas, for leaks has been patented.

The method comprises placing solid carbon dioxide in the cans after filling, but before sealing, in suffi-

"You know

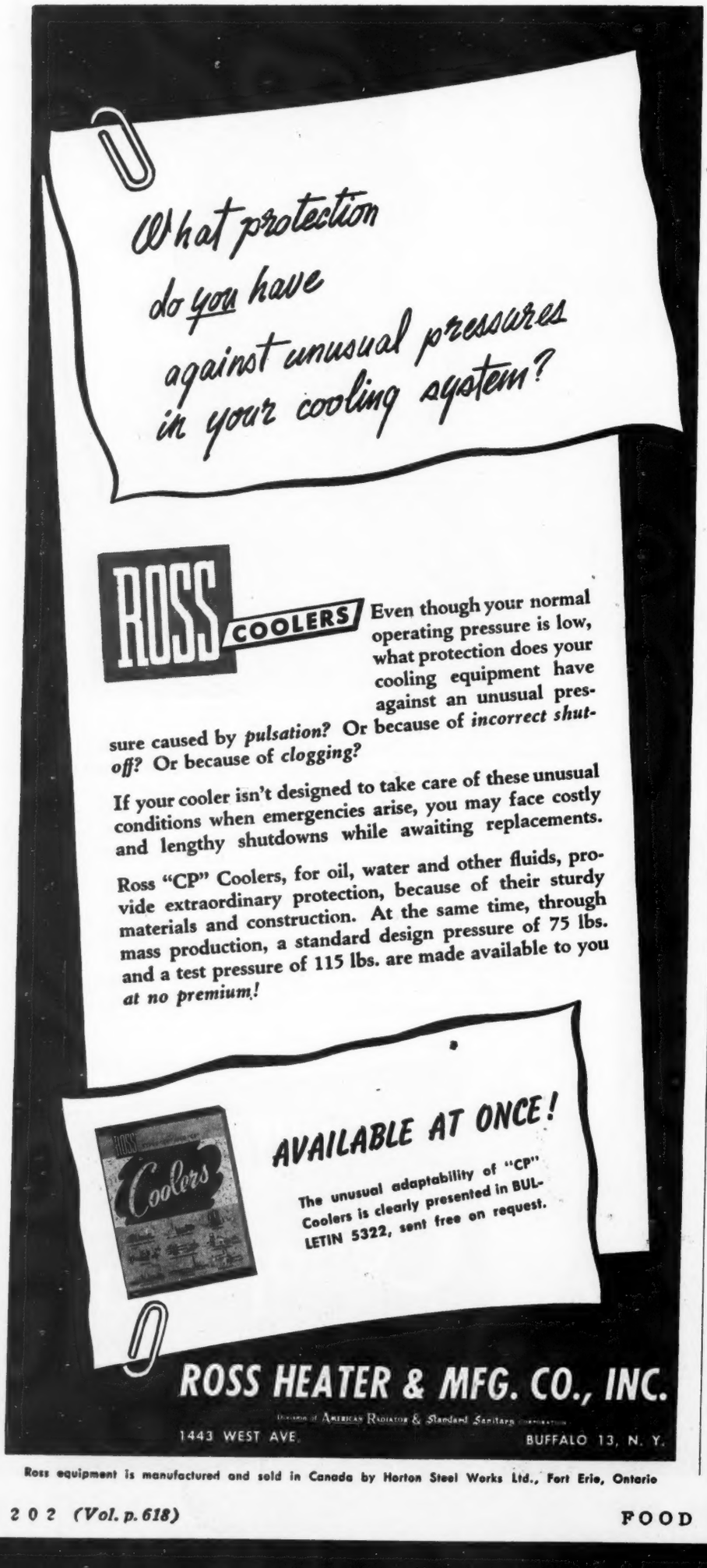
WHEN YOU SEE IT PROTECTED IN CELLOPHANE!"

Women have confidence in Cellophane-packaged products. They know that this moistureproof material does a good job in keeping foods sanitary, fresh and flavorful.

You can count on added goodwill for your product when it's packaged in Du Pont Cellophane. Then shoppers can see what they're getting . . . and can see it's well protected. What's more, Du Pont Cellophane is truly economical.

The demand still exceeds the supply, but we hope the day is now not far off when our converters and ourselves can supply all requirements.

E. I. du Pont de Nemours & Co. (Inc.), Cellophane Division, Wilmington 98, Delaware.


What protection
do you have
against unusual pressures
in your cooling system?
ROSS COOLERS
Even though your normal operating pressure is low, what protection does your cooling equipment have against an unusual pressure caused by *pulsation?* Or because of *incorrect shut-off?* Or because of *clogging?*
If your cooler isn't designed to take care of these unusual conditions when emergencies arise, you may face costly and lengthy shutdowns while awaiting replacements.
Ross "CP" Coolers, for oil, water and other fluids, provide extraordinary protection, because of their sturdy materials and construction. At the same time, through mass production, a standard design pressure of 75 lbs. and a test pressure of 115 lbs. are made available to you *at no premium!*
Coolers
AVAILABLE AT ONCE!
The unusual adaptability of "CP" Coolers is clearly presented in BULLETIN 5322, sent free on request.
ROSS HEATER & MFG. CO., INC.
1443 WEST AVE. BUFFALO 13, N. Y.
Ross equipment is manufactured and sold in Canada by Horton Steel Works Ltd., Fort Erie, Ontario

cient quantity to create an internal pressure on sublimation, which causes the walls to bulge if free from leaks. The quantity of solid carbon dioxide added is such that the product will absorb sufficient gas, in due time, to reduce the pressure and permit the walls of the can to return to their initial flat condition. After sufficient time has elapsed, to permit practically complete sublimation of the solid carbon dioxide, the cans with bulging walls are separated from the cans with flats.

Digest from U. S. Patent 2,391,354, issued December 18, 1945, on an application dated May 5, 1944, to H. M. Slosberg, and assigned to Continental Can Company, Inc., New York, N. Y.

FLAVOR

Powdered Flavor

RICE STARCH, coated with flavoring, to be used in place of alcohol flavoring extracts is the subject of a recent patent.

It is claimed that the flavor, so carried, is easily mixed in dry materials, and that the starch colloid actually exerts a stabilizing effect upon ice cream and other milk products. Typical flavoring materials are vanilla, lemon and strawberry.

In addition to ice cream this flavoring material is recommended for baking and other food products. In chocolate milk, it is claimed, sedimentation and settling of cocoa powder is prevented. In soda fountain sirups and certain candies, crystallization is prevented.

Digest from U. S. Patent 2,389,770, issued Nov. 27, 1945, on an application dated Dec. 2, 1939, to Kenneth M. Gaver, and assigned to The Ohio State University Research Foundation.

BREWING

Waterless Pasteurizer

SUCCESSFUL operation, on an experimental scale, of a waterless beer pasteurizer is reported from England. Water used as a heat transfer medium in conventional types of pasteurizers is replaced by vapor which is conditioned in a mixing chamber before circulating through the equipment.

The bottled beer is brought to the desired temperature in a pre-pasteurization zone that can be controlled so as to obtain pasteurization temperatures in the shortest possible time. It is claimed that the vapor pasteurization produces flat-topped temperature charts. From the pre-heating zone the bottles pass into the actual pasteurization zone

6 SMART HELPS TO FOOD PACKERS

1 This year the U. S. onion stocks are at their lowest level in 7 years ... prices may be higher ... get fixed onion costs with Basic.

2 Laboratory controlled BASIC products give your foods the *same* fresh flavor and the same strength day after day at less cost, because:

3 You save 15 handling operations in the preparation of fresh onions, which includes sorting, washing, peeling, rooting, slicing, chopping, grinding, etc.

4 Basic onion and garlic is fully prepared ready to use ... it's cleaner, saves manhours, lowers your overall food costs.

5 Over 20% of fresh onions is wasted in skins, tops, roots, decay, sprouts, diseased onions and sack dirt ... Basic saves waste.

6 BASIC GARLIC saves you 80 per cent of your fresh garlic costs and gives you far better results.

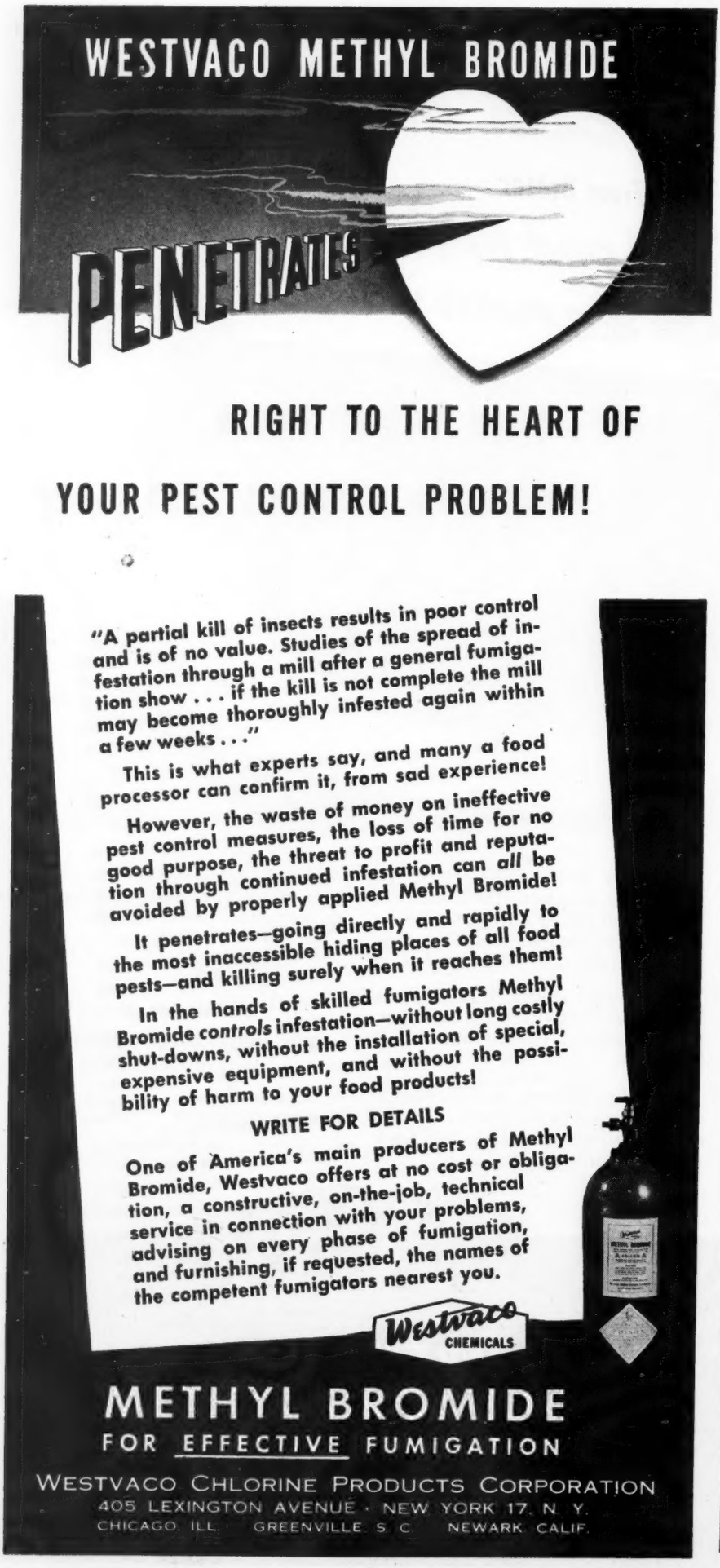
SEND FOR FREE BOOKLET

BASIC VEGETABLE PRODUCTS CO.
VACAVILLE, CALIFORNIA

315 Montgomery Street
San Francisco, California

2376 E. 71st St.
Chicago 49, Illinois

100 Hudson Street
New York, N. Y.


WESTVACO METHYL BROMIDE
PENETRATES
RIGHT TO THE HEART OF
YOUR PEST CONTROL PROBLEM!
"A partial kill of insects results in poor control and is of no value. Studies of the spread of infestation through a mill after a general fumigation show . . . if the kill is not complete the mill may become thoroughly infested again within a few weeks . . ."
This is what experts say, and many a food processor can confirm it, from sad experience!
However, the waste of money on ineffective pest control measures, the loss of time for no good purpose, the threat to profit and reputation through continued infestation can all be avoided by properly applied Methyl Bromide!
It penetrates—going directly and rapidly to the most inaccessible hiding places of all food pests—and killing surely when it reaches them!
In the hands of skilled fumigators Methyl Bromide controls infestation—without long costly shut-downs, without the installation of special, expensive equipment, and without the possibility of harm to your food products!
WRITE FOR DETAILS
One of America's main producers of Methyl Bromide, Westvaco offers at no cost or obligation, a constructive, on-the-job, technical service in connection with your problems, advising on every phase of fumigation, and furnishing, if requested, the names of the competent fumigators nearest you.
Westvaco CHEMICALS
METHYL BROMIDE
FOR EFFECTIVE FUMIGATION
WESTVACO CHLORINE PRODUCTS CORPORATION
405 LEXINGTON AVENUE · NEW YORK 17, N. Y.
CHICAGO, ILL. GREENVILLE, S. C. NEWARK, CALIF.

heated by vapors of controlled temperature. The time of passage through this chamber is governed by the speed of the conveyor mechanism. Finally, a cooling zone provides progressively reduced temperatures until the bottles pass into the atmosphere. The vapor pasteurizer, which is very light in comparison with the spray and immersion types, may be operated as a batch system or the movement of the bottles may be mechanical. Using vapors at 165 deg. F., the beer temperature in the bottle was raised from 60 to 135 deg. F. within 10 minutes.

Digest from "Beer Pasteurization," by A. J. C. Cosbie, *Journal Institute of Brewing*, 51, 233, 1945.

MISCELLANEOUS

Toxicity of Manganese In Acid Soils

FIELD ACIDITY leaf symptoms in cauliflower and runner beans are due to toxicity of manganese. The effects are considerably modified by calcium status, being particularly severe when calcium is at a low level.

In examining crop failures on acid soils, workers at Long Ashton Research Station, Bristol, England, studied the visual symptoms shown by runner beans and cauliflower in the field and in sand cultures. Sand culture experiments were carried out, using nutrient solutions with a constant pH of 5.2, with calcium, manganese and aluminum. Visual symptoms of calcium deficiency in the runner bean were: leaves became slightly pale green as for moderate deficiency of nitrogen, with necrotic spots, especially near tips and around margins, and progressing inwards intervenally. In cauliflower, young leaves were distorted, with tips brown and sharply hooked either backward or forward: older leaves, marginal and intervenal areas became wilted and finally brown.

Typical symptoms of calcium deficiency were developed in all low calcium cultures of runner beans. In cauliflower the symptoms have been only slight and no leaf effects due to aluminum have developed. In the medium and high manganese series the symptoms have been striking.

Results bring out the importance of manganese toxicity in acid soils. They further emphasize the importance of the visual method as a means of diagnosis of the causes of crop failures due to defective nutri- and of the sand culture technic.

Digest from "Determination of Factors Injurious to Plants in Acid Soils," by T. Wallace, E. J. Hewitt and D. J. D. Nicholas, *Nature*, vol. 156, 778-79, December 29, 1945.

complete, *adj.* 1. No part lacking. 2. Perfectly equipped.—*Syn.* Entire, total.

. . . as in Betner packaging service

The dictionary says those things, and more, about the word "complete."

Customers say those things, and more, about Betner Packaging Service.

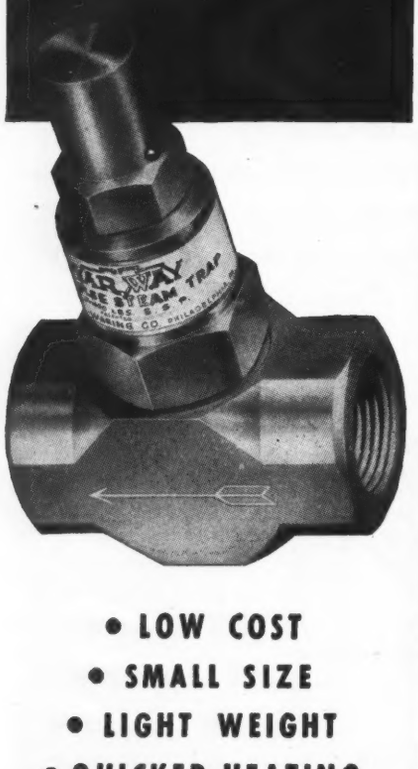
Glad they are to find, at Packaging Hq., as much or as little, package-wise, as their set-up needs. Some want us merely to make their bags. O. K. Others enlist our artist-specialists to design a bag, and our presses to print it. O. K. Still others take our newest service, the installation of Benco machinery for loading and sealing their product. O.K.

Some want the works! Oh *Kay!*

Yes, "complete" is the word for what we have in the way of packaging service; as much or as little of what we have as pleases you. Ask for more "complete" details; no obligation, of course.

Benj C Betner Co DEVON, PA.

BENJ C BETNER CO OF CALIFORNIA, LOS ANGELES, CAL.



• LOW COST
• SMALL SIZE
• LIGHT WEIGHT
• QUICKER HEATING
• ONE MOVING PART

Sold by more than 100 Mill Supply Distributors throughout the U. S. A. See your supply house or *write for Catalog* T-1739.

YARNALL - WARING CO.
127 Mermaid Ave., Phila. 18, Pa.

YARWAY
IMPULSE
STEAM TRAP

BOOKS

Food Law

ROBINSON-PATMAN ACT SYMPOSIUM. Published by Commerce Clearing House, Inc., 350 Fifth Ave., New York, N.Y., 1946. 6x9 in.; 105 pages; paper. Price, $1.00.

A special meeting of the section on Food, Drug and Cosmetic Law of the New York State Bar Association, late in January, produced the papers contained in this review. It records a two-day discussion on the many aspects of the Robinson-Patman Act, which amended two sections of the Clayton Act. It should be useful to the legal representatives of all food processors, covering, as it does, so many of the legal problems in food distribution and adulteration.

Policy on Farming

AGRICULTURE IN AN EXPANDING ECONOMY. Published by the Committee for Economic Development, 285 Madison Ave., New York 17, N.Y., 1945. 8½x11 in.; 45 pages; paper. Free on request.

This is a statement of policy, formed by the research committee of CED, that resulted largely from the discussions accompanying preparation of the study, "Agriculture in an Unstable Economy," by Theodore W. Schultz. It is intended as a contribution to the better understanding of present conditions and future prospects of American agriculture.

Industry Compilation

FOOD PRODUCTS DIRECTORY FOR 1945-46. Published by W. J. McCamman, 1202 Hearst Bldg., San Francisco 3, Calif., 1945. 8x10¼ in.; 1035 pages; cloth. Price, $10.00.

Identified as "The Blue Book of Food Packers," this compilation is more than its title implies. It is essentially a one-volume encyclopedia on processors, packers, importers, and wholesale merchandisers of food in the United States and its territories.

Listings are made by company name according to states in which both main and branch plants and offices are located, according to product packed or processed, according to brand or label used, and according to method of packing.

Also included is an alphabetical listing of canners, packers and importers of food products in general, as well as packers and shippers of dried fruits, nuts, beans, popcorn and rice specifically; frozen food packers and vegetable dehydrators. This alphabetical listing is supplemented by a classified directory of suppliers of equipment, materials and services, including advertising agencies.

Whether one is a purchaser, a processor, or a merchandiser of foods he will find this compilation a complete and convenient reference source of information on food companies and products.

Planning Research

PLANNING OF RESEARCH AND DEVELOPMENT WORK. By Dwight L. Williams. Published by Wallace Clark & Co., 521 Fifth Ave., New York 17, N.Y. 6x9 in.; 27 pages; paper. Free.

Here is a short, interesting monograph by a member of a firm of management consultants. It outlines a general program for setting up a research department in which both the scientific requirements and the administrative necessities are taken into account.

It should be useful, as a preliminary study, to the food plant operator who is considering the important step into research, or whose research department is not now what it should be.

Industrial Nurse

NURSING IN COMMERCE AND INDUSTRY. By Bethel J. McGrath. Published by The Commonwealth Fund, 41 E. 57th St., New York 22, N.Y. 6x9½ in., 356 pages; cloth. Price, $3.00.

This might be regarded as a companion book to "Medicine in Industry," except that its application is more direct. It is a useful book for those in whose care the sick or injured are placed, whether it be a plant dispensary or an industrial hospital.

Like the other study, its contents should be—but often is not—familiar to every manufacturing plant's personnel department. The chapters on "Women in Industry" and "Communicable Disease Control" should be particularly valuable to the food plant operator.

Industrial Medicine

MEDICINE IN INDUSTRY. By Bernhard J. Stern. Published by The Commonwealth Fund, 41 E. 57th St., New York 22, N.Y. 5½x8½ in.; 209 pages; cloth. Price, $1.50.

The food industry has the same heavy stake in the health and physical welfare of its workers as have all

other branches of our highly industrialized economy. This study traces in broad perspective the social, economic, legal and professional setting within which industrial medicine has progressed. The author offers data on the rates of industrial disability and the limited extent of preventive services.

The book's value is by no means confined to the industrial physician. There is a wealth of data and information born of research that both top management and those concerned with personnel should want to know.

GOVERNMENT PUBLICATIONS

PRICE SPREADS BETWEEN FARMERS AND FOOD PRODUCTS 1913-44. Bureau of Agricultural Economics. Department of Agriculture Miscellanous Publication No. 576. Available from Superintendent of Documents, Washington 25, D. C. Price, 45 cents.

PEA DISEASES AND THEIR CONTROL. By L. L. Harter, W. J. Zaumeyer, and B. L. Wade. Bureau of Plant Industry, Soils, and Agricultural Engineering. Farmers' Bulletin No. 1735. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

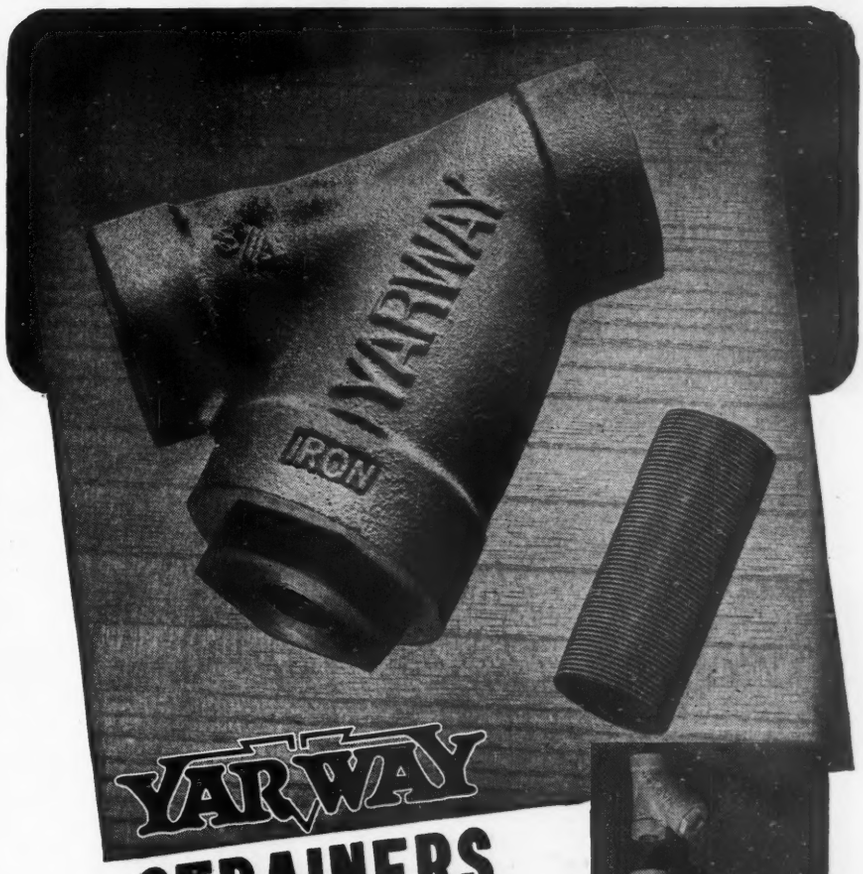
PRECOOLING CALIFORNIA GRAPES AND THEIR REFRIGERATION IN TRANSIT. By W. T. Pentzer, C. E. Asbury, and W. R. Barger. Bureau of Plant Industry, Soils, and Agricultural Engineering. Department of Agriculture Technical Bulletin No. 899. Available from Superintendent of Documents, Washington 25, D. C. Price, 15 cents.

REACTION OF SMALL-GRAIN VARIETIES TO GREEN BUG ATTACK. By I. M. Atkins and R. G. Dahms, Bureau of Entomology and Plant Quarantine. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

CITRUS FRUITS — PRODUCTION, FARM DISPOSITION, VALUE AND UTILIZATION OF SALES, CROP SEASONS, 1909-10 and 1943-44. Unnumbered mimeographed. Available on request to Production and Marketing Administration, Department of Agriculture, Washington 25, D. C.

CITRUS: REVISED ESTIMATES OF PRODUCTION AND UTILIZATION, 1943-44 and 1944-45. Unnumbered mimeographed. Available on request to Production and Marketing Administration, Department of Agriculture, Washington 25, D. C.

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, Calendar Year 1943. Fish and Wildlife Service, Statistical Digest 12. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.



YARWAY

STRAINERS

"Police the Pipelines"

YARWAY STRAINERS are *selling by the thousands* because they are better engineered for the service.

"The Screen is the Thing"—a high-grade, woven Monel wire screen that stops the dirt, lets fluids flow freely.

Then, too, purchasers like the *body finish —Cadmium plated* for protection against corrosion and for better appearance.

And last but not least, it is *"Easy to Clean"* having a steel blow-off bushing, precision machined with straight thread. Screen and bushing come out together—go back together, automatically aligning.

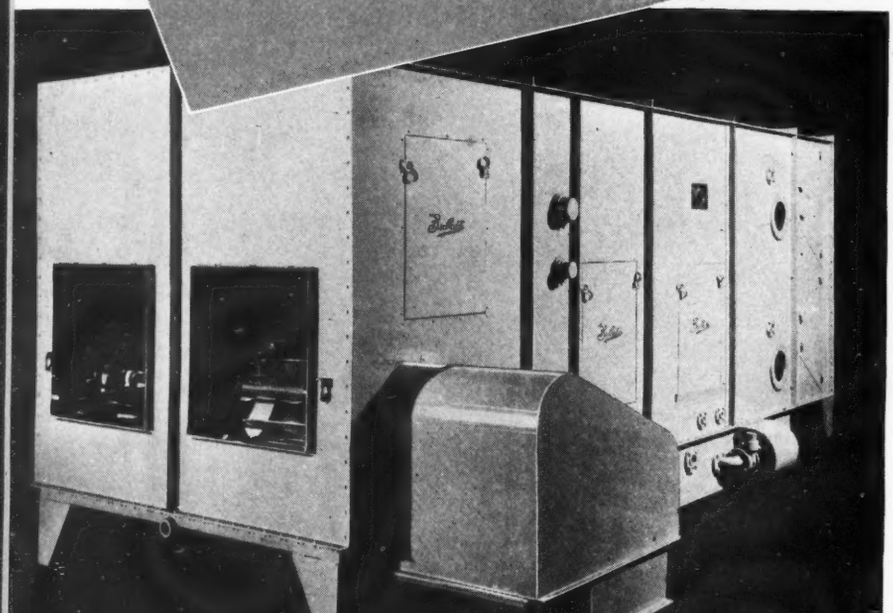
Six sizes, ½" to 2" for pressures up to 600 lb serve practically all strainer needs.

Sold by over 100 Mill Supply Houses. See your Supply House or write for Bulletin S-200.

YARNALL-WARING COMPANY
127 Mermaid Avenue PHILADELPHIA 18, PA.

YARWAY STRAINERS

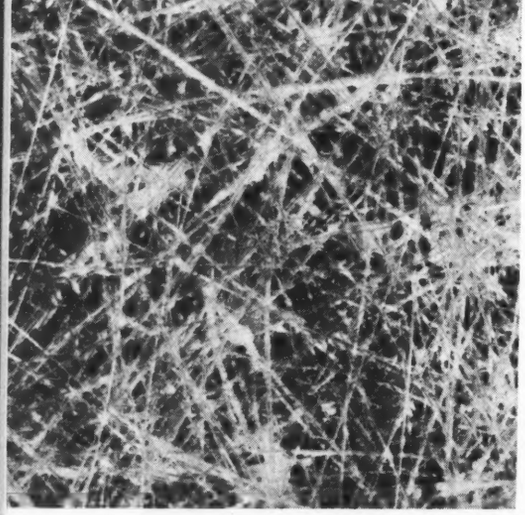
DUST-FREE AIR *at Low Cost!*



Your interest in dust-free, pr
erly humidified and tempered
is no doubt also concerned w
the cost of putting such air i
your plant.

With more than forty years' ex
rience in building air-conditi
ing apparatus for many of Am
ica's most prominent industr
plants, Buffalo engineers ha
concentrated on developing l
cost equipment for this service

The Buffalo Wet Glass Cell
Washer, announced several ye
ago, is the most recent addition
the complete "Buffalo" line.



The Glass Filters used in Buffalo Wet Glass Cell Air Washers are contained in removable metal casings. They may be removed and cleaned in cleaning solution, restoring their original cleaning efficiency.

This Unit gives superior air cleaning plus all the
cepted qualities of air conditioning. Its just cost is m
erate. Its operating cost is low. Already hundreds
installations are in service, with universal satisfacti

Write today for Bulletin 3457 which gives compl
information.

BUFFALO FORGE COMPAN

152 Mortimer St. **Buffalo, N**

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" **WET GLASS CELL AIR WASHERS**

PATENTS

BAKING

Batter Mixture for Baking Made to Consist of Neutral Starch, Lactide, and Calcium Carbonate in Finely Divided State—Robert L. Lloyd, Laurelton, N. Y., and Ben F. Buchanan, Leonia, N. J., to American Maize-Products Co. No 2,394,791. Feb. 12, 1946.

Sandwich-type Cookies Made by Mechanical Means—Robert O. Manspeaker, Chicago, Ill. No 2,394,795. Feb. 12, 1946.

BEVERAGES

Top-fermentation of Beer Carried Out in Sterile Air—Stephen Towers Clarke, Southampton, England. No. 2,393,518. Jan. 22, 1946.

CEREALS

Cereal Grain Cleaned and Husked by Flotation Method—Arthur C. Daman, to Mining Process and Patent Co., Denver, Colo. No. 2,393,975. Feb. 5, 1946.

CONFECTIONERY

Cakes Decorated by Overlying Layer of Thin Sheet of Edible Wafer Paper Carrying Ornamental Motif—Thomas McKee, Jackson Heights, N. Y., to A. Winburn, New York, N. Y. No. 2,394,322. Feb. 5, 1946.

Sherbet Made to Contain Small Quantity of Aerating-type Stabilizer Consisting of Gelatin, Locust Bean Gum, and Sodium Carboxy Methylcellulose and Finely Divided Dry Milled Oats Containing More Than About 20 Percent Total Protein—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,395,060. Feb. 19, 1946.

DAIRY

Brittle, Solidified Butter Converted Into Smooth-textured Spreadable State By Mechanical Means—Herman C. Horneman, Ralph V. Hussong, and Sidney N. Quam, Danville, Ill., and Bernard W. Hammer, Ames, Ia., to Cherry-Burrell Corp., Chicago, Ill. No. 2,395,051. Feb. 19, 1946.

Homogenized Milk Gassed With CO_2 Under Two-atmosphere Pressure Preparatory to Bottling — Hans Griesbeck, Cologne, Rhine, Germany, to Alien Property Custodian. No 2,394,303. Feb. 5, 1946.

Ice Cream and Ice Milk Mixes Stabilized By Addition of Small Quantity of Polyhydric Alcohol Ester Having at Least One Free Hydroxyl Group and Finely Divided Dry-milled Oats Containing More than 20 Percent Total Protein—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,395,061. Feb. 19, 1946.

FATS AND OILS

Fatty Oils Treated With Liquefied Solvent, Normally Gaseous, for Separation Into Plurality of Fractions Having Different Properties As Steps in Vitamin Concentration — Leo J. Van Orden, Bloomfield, N. J., to M. W. Kellogg Co., Jersey City, N. J. No 2,394,968. Feb. 12, 1946.

Vegetable Oils Treated To Remove Phosphatides Prior to Refining With Alkaline Fuller's Earth—Percy L. Julian, Maywood, Ill., and Herbert T. Iveson, Chicago, Ill., to The Glidden Co., Cleveland, Ohio. No. 3,392,390. Jan. 8, 1946.

FRUITS AND VEGETABLES

Juice-containing Material Mechanically Ground Preparatory to Extraction of Juice Content—Phillip Markowitz, Homestead, Fla. No. 2,394,459. Feb. 5, 1946.

PACKAGING

Bag Filling Device—Edric W. Vredenburg, Berkeley, Calif. No. 2,392,204. January 1, 1946.

Method of Making Fluid-Tight Bags—Harry F. Waters, New York, N. Y. No. 2,392,206. January 1, 1946.

MISCELLANEOUS

Citric Acid Synthesized by Growing Aspergillus wentii on Carbohydrate Medium Under Constant Agitation and Aeration—Selman A. Waksman, Highland Park, and Edward Otto Karow, New Brunswick, N. J., to Merck & Co. Inc., Rahway, N. J. No. 2,394,031. Feb. 5, 1946.

Liquid Egg Yolk Or Mixture of Both Liquid Whites and Yolks Stabilized at Normal Refrigeration Temperature By Addition of Sugar and Partial Ester of Fatty Acid and Polyhydric Alcohol—Everette C. Scott and Clinton H. Parsons, to Industrial Patents Corp., Chicago, Ill. No. 2,395,587. Feb. 26, 1946.

Vinegar Made to Contain More Than 12 Percent Acetic Acid—Frederick C. Silbernagel, to A. M. Richter Sons Co., Manitowoc, Wis. No. 2,395,510. Feb. 26, 1946.

Vitamin-containing Oil Proportioned Into Food Products of Granular Character By Forming Temporary Emulsion and Continuous Spraying of Emulsion Into Dry Granular Mix Under Continuous Movement and Subsequent Mixing—Alan C. Richardson, Berkeley, Calif., to California Packing Corp., San Francisco, Calif. No. 2,395,067. Feb. 19, 1946.

Wood-Sugar Solution Purified for Removal of Resinous Constituents—Heinrich Scholler, Munich, Germany, to Alien Property Custodian. No. 2,394,334. Feb. 5, 1946.

Sterols Recovered From Yeast and Other Cellular Material Containing Saponifiable Fat—Kenneth J. Goering, Ames, Ia. to Anheuser-Busch, Inc., St. Louis, Mo. No. 2,395,115. Feb. 19, 1946.

CANADIAN PATENTS

Fish Moved to Beheading Machine in Continuous Manner by Mechanical Feed Table—Norford L. Oates, to Smith Cannery Machines Co., Seattle, Wash. No. 432,314. Jan. 1, 1946.

Juices Obtained From Fruits and Vegetables by Combination Toothed Rotary Titurating Disk and Press—Joseph MacRae Newman, Weston, Ontario. No. 432,373. Jan. 8, 1946.

Cheese Formed in Horizontal Hydraulic Cylinder Press—Norman J. Peters, to Damrow Bros. Co., Fond du Lac, Wis. No. 432,648. Jan. 22, 1946.

U. S. Patents Available For Licensing or Sale

Further information concerning this patent is obtainable from the U. S. Patent Office, Washington, D. C. It should be identified by its Register Number as well as by its Patent Number. Names given are those of owners of the patents.

Juices Extracted From Precooled Citrus Fruit, Deaerated, Frozen to Slush, Packaged and Frozen Solid for Storing and Shipping With Retention of Vitamin Content—Valentine Ruch IV and Helen R. Ruch, Wilkins Place, Tenafly, N. J. No. 2,117,215; granted May 10, 1938. Register No. 819.

So you think **HE'S** *fast!*

Just because a guy can run 100 yards in less than 10 seconds, you compare him to a flash of lightning. Listen a minute, while we tell you about a *salt* that's fast . . . and why it's important to you.

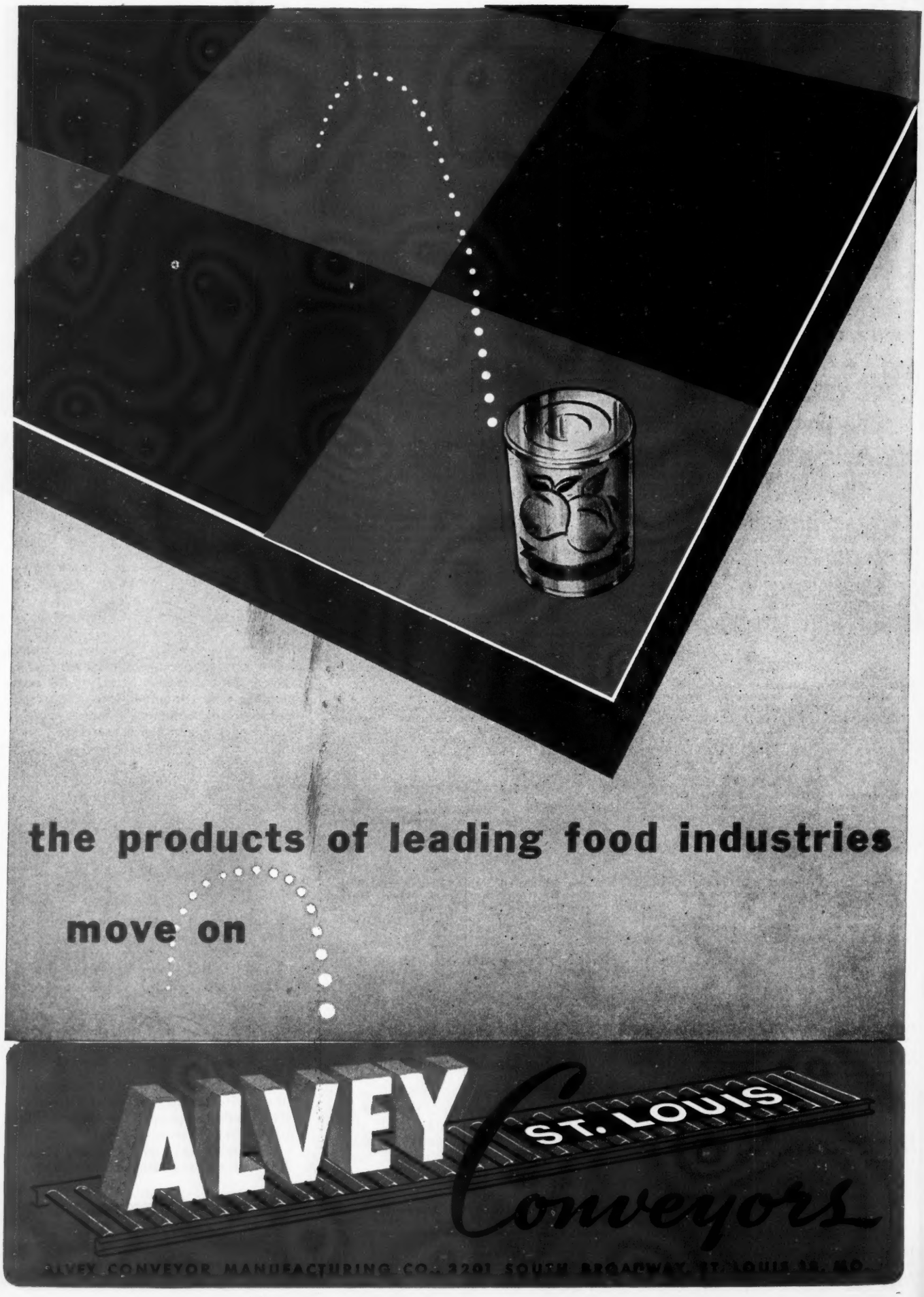
In salting butter, salt must dissolve with lightning speed. If the butter is on the soft side, butter salt must dissolve so quickly that overworking is avoided. Otherwise, the butter may become mottled or marbled, lose its moisture, become leaky. Yet, if the salt is not properly dissolved, the butter may be gritty. So, remember that Diamond Crystal Butter Salt dissolves completely in water at 65° F. at an average rate of 9.2 seconds.

On the other hand, there are instances where slow solubility of salt is highly important . . . such as in salting cheese. Here slow solubility prevents salt being lost in whey, producing undersalted cheese. To meet *all* these problems, we have set up definite solubility standards for Diamond Crystal Salt.

Need Help? Write for It!

If salt solubility enters into your processing, write to our Technical Director. He'll gladly recommend the correct grade and grain of Diamond Crystal Salt for best results. Diamond Crystal, Dept. J-15. St. Clair, Michigan.

DIAMOND CRYSTAL
Alberger PROCESS SALT


the products of leading food industries
move on
ALVEY
ST. LOUIS
Conveyors
ALVEY CONVEYOR MANUFACTURING CO., 2201 SOUTH BROADWAY, ST. LOUIS 18, MO.

Letters to the Editor

Candy Kettles— Copper or Stainless?

To the Editor
of Food Industries:

WE note with considerable interest an article in the December issue of FOOD INDUSTRIES, page 87, written by Walter H. Eddy of New York, who draws a comparison between kettles built of copper and stainless steel for use in the manufacture of candy.

We have been making both copper and stainless steel kettles and selling them to the manufacturing confectioner for many years. Our findings are that stainless steel kettles, as we make them, are easier to clean since they are built of seamless drawn shells. Being of much harder material than copper, they are much less likely to become worn from abrasion.

There need be no difference in the time required to heat a given batch of material when using either copper or stainless steel. When using stainless steel, a much harder and stronger material, the inner shells can be made of considerably lighter material than would be required if copper were used, thus permitting a rapid heat transfer through the inner shell. Hard copper has a tensile strength of 30,000 lb. per sq. in., while stainless steel has a tensile strength of 75,000 lb. per sq. in.

Nearly all of the copper kettles built today are of riveted construction, the outer shell being riveted to the inner shell and sealed with solder. No matter how carefully a copper kettle is made, there still remain the rivet heads on the outside, which collect dirt and are hard to keep clean. Further, copper kettles require repairs and retinning at times, and must be taken apart and re-hammered or re-riveted, an expensive operation. As manufacturers of both stainless steel and copper kettles, we find that some of the largest processors in the country have eliminated copper entirely and have gone over to either all stainless steel kettles or a combination of stainless steel with nickel inner shells.—R. B. LAWS, *manager, Industrial Sales, B. H. Hubbert & Son, Inc., Baltimore.*

Author's Reply

IN REGARD to the statements of Mr. Laws, I have taken pains to check with a large manufacturer and also with an extensive user of copper candy kettles. The manufacturer, an official of one of the largest coppersmithing firms in the country, which has made kettles for three generations, emphasizes the fact that copper gives much quicker heat than stainless steel. That is why stainless steel cooking utensils for household use are made with copper bottoms. As to the longevity of copper or stainless steel, the records of this firm indicate that copper kettles, in some instances, have given more than half a century of satisfactory service and are in as good a state of preservation today as when first installed.

The chocolate manufacturer consulted, one of the largest in the world, has been operating a battery of copper kettles for 40 years. He states that they are not hard to clean, that they give satisfactory service and that only recently an additional copper kettle has been ordered along with other copper equipment.—WALTER H. EDDY, *New York, N. Y.*

Write Today!

Foresighted manufacturers are spending money in these pages to tell you about their products and service. They are ever ready to help you solve your problems. Find out what they can do to help you! Write today!

MERCOID CONTROLS

Hermetically sealed mercury switches used exclusively in all Mercoid Controls. They are not affected by dust, dirt or corrosion, thereby assuring better control performance and longer control life. Complete catalog sent upon request.

4221 BELMONT AVE CHICAGO 41 ILL.

MADE BY THE MERCOID CORPORATION

Mercoid Controls are first choice among leading engineers throughout industry. They are used on industrial applications involving the control of temperature and pressure. Available in various ranges. Controls also for liquid level, etc.

Sandvik
"STAINLESS"
STEEL
CONVEYOR
BELTS

• *"Stainless" for Sanitation.*

Ideal for handling or processing in the food industries. Cold rolled from 18-8 Stainless Steel having a low percent of carbon. Has a bright, smooth surface—true stainless quality and meets the severest sanitary conditions.

CAN BE PRE-TROUGHED

for handling loose or semi-liquid materials!

Can also be perforated, if desired. Rolled in lengths of 350 to 500 feet, widths from 8" to 32", or 38" to 61" with longitudinal joints. Sandvik Stainless Steel Belts are now in use by many of the foremost and largest Food Plants in the country. Our Engineering Department is at your service for consultation without obligation.

Illustrated Circular
showing many installations and specifications sent on request. See also insertions in Sweets Catalog and Food Industries Catalog.

SANDVIK STEEL INC. 111 Eight Ave., New York 11, N.Y.

1736 Columbus Road, CLEVELAND 13, OHIO
180 North Michigan Ave. CHICAGO 1, ILL.
4415 So. Main Street, LOS ANGELES 37, CAL.

IF YOU MANUFACTURE DRY PACKAGED FOOD SPECIALTIES

we'd like to tell you about our Powdered Fruits for Pie Mixes and Pudding Mixes We shall process this year

Apricot **Apple** **Prune**
Raspberry **Strawberry** **Grapefruit**
Lemon **Grape** **Raisin**

Our representative will call to see you on request.

Sardik Food Products Corporation
420 Lexington Avenue, New York 17, N. Y.

Electronic Heat

(*Continued from page* 93)

4. That electronically heated material escapes the conventional laws of thermo-dynamics, chemistry, etc., and that nothing limits the maximum speed of electronic heat.
5. That dielectric fields, as such, have germicidal power.
6. That electronic heaters have some mysterious effect upon persons.

It would be unprofitable to waste time exposing each fallacy in detail, but some of them sound so reasonable that we should have a closer look.

The special frequency seems logical until one runs tests on food after food as represented in Fig. 8. It then appears that over the usable frequency range we have no magic frequency and that we could use most any practical value as long as it is effective and does not require too high a voltage across the product. In spite of exceptions in the chemical field we may certainly state that thus far no magic frequency has basis for recognition in the heating of food products.

Higher frequency sounds progressive but it gives better results only if lower work voltages are essential or if some unusual circumstance exists. To use higher frequency without actual need is foolish due to the following penalties: (a) Increased equipment cost (b) loss of overall efficiency and (c) restriction of work area to a size too small to handle the required pounds per hour or pounds per batch.

Electronic heater fields have neither germicidal power nor human sterilization power. A glance at the industrial frequencies chart on Fig. 9 will show how far electronic heating frequencies are removed from both these effects. Electronic heaters have no direct germicidal action and certainly do not affect persons in any manner whatsoever. They are merely capable of producing heat in a faster and more effective manner. The heat so created may be more advantageously located but it behaves exactly like a B.t.u. from any other heat source.

Development Forecast

In addition to the applications mentioned, we may reasonably expect to see electronic defrosters developed for commercial kitchens and for frozen food stores.

Electronic cookers for special restaurant and domestic use are practical but still expensive. Additional developments in this line can be expected.

FEATURES YOU CAN AND CAN'T SEE IN THIS REFRIGERATION COMPRESSOR

Close study of this Worthington Vertical, Two-Cylinder, Single-Acting Enclosed Compressor — made in five sizes from 6″ x 6″ to 10″ x 10″ — reveals features that guarantee maximum efficiency and long life. For instance: main and outboard bearings of the self-aligning double-row roller type; force-feed lubrication of cylinders, bearings and pins; large area Feather* Valves on suction and discharge . . . lightest, quietest, most efficient ever designed for compressor use; safety head on discharge to reduce slop-over hazard; unit-type manifold with stop, by-pass and pump-out valves and improved quick-opening relief valve. Bulletin C-1100-B18A gives all the facts about these and other features. Write for it — today.

OTHER WORTHINGTON ADVANTAGES

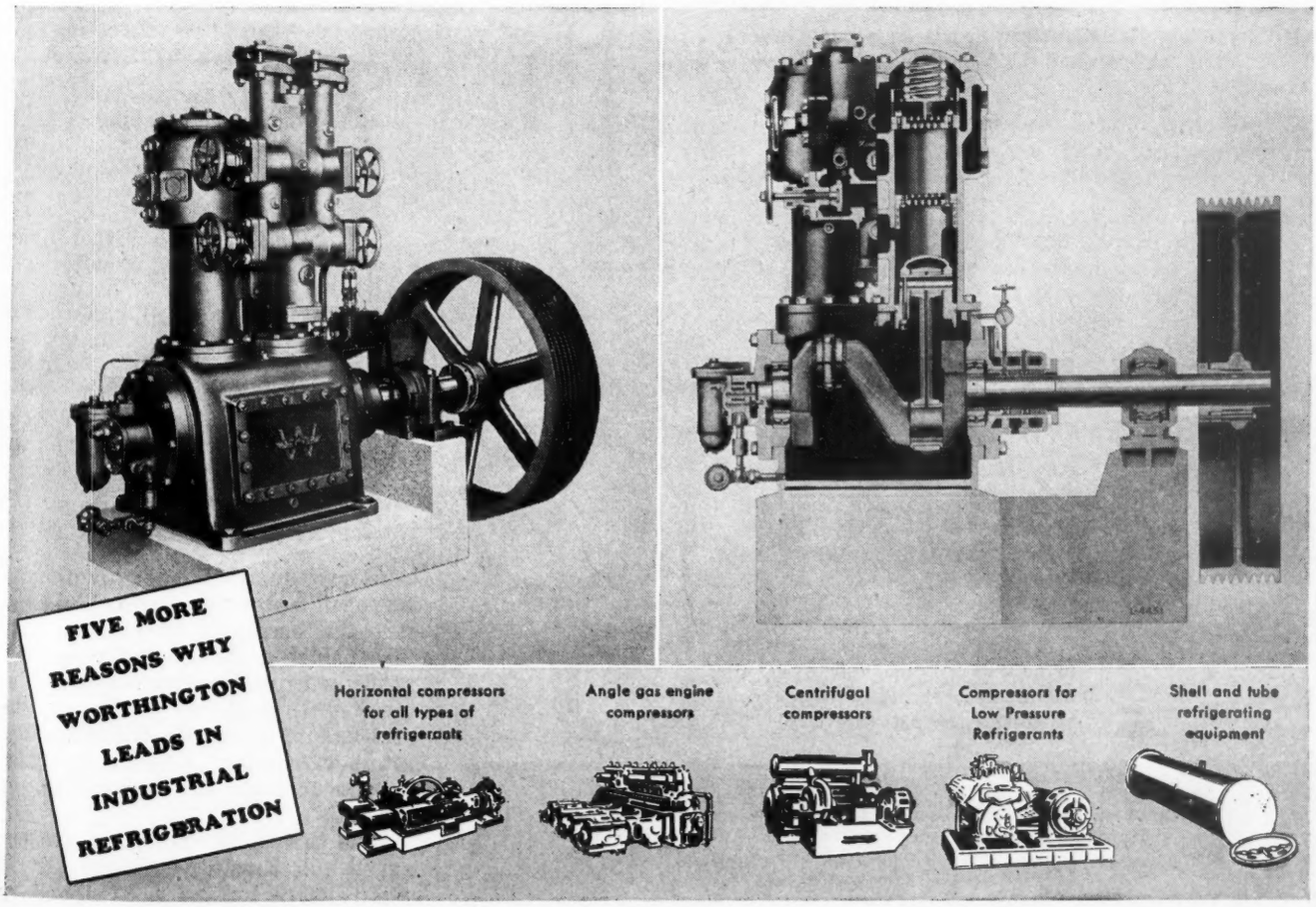
There's more to a Worthington Refrigeration Compressor than what you can see or read in the specifications. There's the application skill that accounts for the vast amount of Worthington Refrigeration equipment in the petroleum industry. There's the engineering ability that has accounted for Worthington's solution to more difficult problems of gases under compression. There's the fact that Worthington makes so many of the "inner vitals" of the high side of a refrigeration cycle that it is your best source of the efficient, economical "integrated" installation you want.

For further proof that *there's more worth in Worthington*, talk things over with your near-by Worthington Distributor, or write direct to *Worthington Pump and Machinery Corporation, Harrison, N. J. Specialists in air conditioning and refrigeration machinery for more than 50 years.*

WORTHINGTON

*Reg. U. S. Pat. Off.

A6-11


FIVE MORE REASONS WHY WORTHINGTON LEADS IN INDUSTRIAL REFRIGERATION
Horizontal compressors for all types of refrigerants
Angle gas engine compressors
Centrifugal compressors
Compressors for Low Pressure Refrigerants
Shell and tube refrigerating equipment

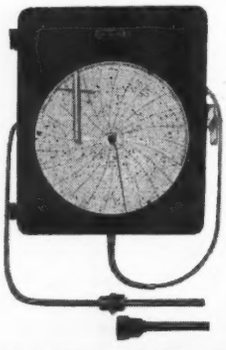
Maybe our imagination is flying a *little* high. But to get out of the sky and down to earth, it's a fact that the "Red-Reading-Mercury" column on a Palmer Thermometer makes it possible to read temperatures more clearly, easily, at a far greater distance—even through smoke and steam!

This clear, sharp "readability" . . . plus precision manufacture, and longer life . . . make Palmer Thermometers, the choice of engineers the world over.

In your plant, too, dependable, easier reading Palmer Thermometers will *best* meet every requirement.

Write for Catalog

PALMER SUPERIOR RECORDING and DIAL THERMOMETERS



Recording Thermometer. Mercury Actuated. 12 in. die-cast aluminum case. Flexible armoured tubing and bulb of stainless-steel. All ranges up to 1000 F. or 550 C.

Dial Thermometers. Mercury Actuated. 8 in. case. Flexible armoured tubing and bulb of stainless-steel. All ranges up to 1000 F. or 550 C.

PALMER THERMOMETERS, INC.

Mfrs. Industrial, Laboratory Recording and Dial Thermometers

2529 Norwood Avenue Cincinnati 12, Ohio

The real development going on now is in the mental attitude of the prospective user of electronic heat. He now recognizes that every electronic heating application has two distinct parts: (1) The high frequency generator, a steel cabinet containing a simple means of converting 60 cycle power into high frequency power and (2) the special fixtures and mechanical handling accessories to apply this high frequency electronic heat quickly and cheaply to the work pieces. Item (1), the electronic heater, is a standard commercial package, easily obtainable from several sources; Item (2), the heating fixture and work mechanization, however, require job engineering in every case and since the job will decide what the electronic heater must be capable of doing, it necessarily follows that the purchase of equipment for an industrial application should be based upon the recommendation of experienced industrial electronic engineers.

When it is realized that substantially all of the high frequency generator's output appears as heat within the product, rather than heat stored in an oven, it is not difficult to conclude that properly applied electronic heat is low cost heat.

—End—

Australia

(*Continued from page* 114)

eries, particularly for common striped tuna by the live bait-fishing method, and for mackerel, salmon, pilchard, sprat, and anchovy by adaptation of the purse-seine method of fishing.

5. By stabilizing the catches in existing fisheries at much higher levels than at present, through scientific conservation.

During 1944, shoals of surface fish, especially tuna and blue mackerel—excellent canning varieties—were observed from the air off the West Australian coast. These shoals were confined to the waters above the continental shelf, bounded broadly by the 100-fathom line.

Costly Problems

As yet, Australia has no authority responsible for developing fisheries in extra-territorial waters. Exploratory fishing trips are costly and beyond the capacity of most private interests. In addition there are the problems of transport, wholesale and retail marketing, holding facilities and the freezing and preservation of fish.

Less than 4,200 fishermen are engaged full time in catching fish in Australia. A total of 1,564 secondary

SEE FAIRBANKS-MORSE FIRST FOR SCALES

Fairbanks-Morse Platform Scale with Printomatic Weigher

WHEN you buy a scale you look for, and expect, a product of dependable accuracy... one that will serve you faithfully and efficiently under even the toughest conditions.

Fairbanks-Morse Scales are the result of continuing research and improvement that keep them ahead in design, adaptability, and performance.

Before buying, be sure to investigate Fairbanks-Morse Scales. Fairbanks, Morse & Co., Chicago 5, Illinois.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines
Scales • Motors • Pumps • Generators
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment

The perfection achieved in the manufacture of Tri-Clover Sanitary Fittings is not luck. It is *"Engineered Perfection."*

From the engineer's drafting board to the sparkling finished product, it is under constant "QUALITY CONTROL." Each precision operation must pass the most exacting inspection before being further processed. The fitting that reaches your plant protects your product from contamination. There are no pockets, nor is there roughness to hold rancid matter loaded with bacteria. Each stainless steel or alloy fitting bearing the TRI-CLOVER trademark is a gem of perfection.

SANITARY FITTINGS VALVES *and* PUMPS

Our engineers welcome your questions. Write for catalog showing
THE Complete Line
1. Triallay (Cupro Nickel) Sanitary Fittings
2. Fabricated Stainless Steel Sanitary Fittings
3. Pumps (Centrifugal—non-agitating) Triallay and Stainless Steel
4. Custom Fabrication
5. Sediment Testers
6. Line Filters
Standardized Accuracy and Interchangeability are YOUR Tri-Clover Guarantee.

TRI-CLOVER MACHINE CO.
KENOSHA, WISCONSIN

operatives are employed in handling and distributing the catch made by fishermen.

The commonwealth will shortly make a bid for the Antarctic whaling industry. Representatives of the external affairs department will attend the International Whaling Conference to be held in London soon. Before the war, Japan and Germany had operated on a large scale in the Antarctic and had captured 23 percent of the whales taken in 1938-39.

Floating Cannery

The Australian government would try to get at least one floating factory ship. The operation of this ship, with a crew of 350, would be worth more than £A1,000,000 each season to the country.

Whale oil production from one ship would exceed Australia's requirements, leaving about 15,000 tons for export. About 40,000 tons of meat-meal for stock and poultry food would be produced. Other byproducts, including fertilizers, pharmaceutical preparations and whalebone, could be made.

Fishermen and fishery authorities alike, realizing the extensive marine food resources available, look to the commonwealth government for assistance in the development of this industry.

—End—

German Fruit Juices

(*Continued from page* 82)

two-stage stainless steel vacuum concentrator was used in making this product, which was preserved by pasteurization at about 175 deg. F. for 1 minute.

Rhubarb juice was manufactured in large quantities by the Seitz-Bühi method. A 4:1 concentrate of rhubarb juice was also made. A mixed rhubarb and apple juice (2:3) was very popular in recent years. Black currant juice has been found very high in ascorbic acid (250-270 mg.). It was mostly sold in a 1:1 mixture with apple juice. Pear juice, strawberry juice, and a number of other fruit juices were also made in large quantities.

Quality Much Emphasized

There were few food products made in Germany during the war where as much stress was laid on quality as with fruit juices. Usually, as the volume of production of a food was increased, its quality suffered. In fruit juices and concentrates, however, constant efforts were made

FRESH...

Fresh—that's exactly what your product *should* be when it arrives at its final destination.

And that's what it *WILL* be if it goes in a Royal Flav-O-Tainer package—a patented duplex, flexible container made with heavy paper outside, and an inside liner of Pliofilm, Cellophane or any other thermoplastic film *completely heat sealed on all seams.*

If your product needs protection, Royal's art and package designing department will be glad to create for you a beautiful and effective container using any of the available Royalflex films.

For fifty one years, a Royal package has provided *outside evidence of inside quality.*

THOMAS M. ROYAL & COMPANY • *Philadelphia 20*

BOSTON • CHICAGO • SAN FRANCISCO • BEAUMONT • ATLANTA • PITTSBURGH • NEW ORLEANS
DENVER • SEATTLE • NEW YORK • ST. LOUIS • DAYTON • DETROIT • SYRACUSE • BRYN MAWR

AS QUICK AS A FLASH YOU CAN KNOW THE EXACT MEASUREMENT OF YOUR VALUABLE STORED LIQUIDS With LIQUIDOMETER Tank Gauges

"LIQUIDS WORTH STORING ARE WORTH MEASURING"

THE LIQUIDOMETER CORP.
38-14 SKILLMAN AVE., LONG ISLAND CITY, L.I., N.Y.

MERCER
"The Name that Carries Weight"
MATERIAL HANDLING EQUIPMENT

PORTABLE STACKING ELEVATORS

Trailer Trucks, Platform Elevators, Conveyors, Wheel Tractor Cranes . . . Material Handling Equipment of every type. Designed to your requirements by experienced engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

Telescopic Type

MERCER ENGINEERING WORKS, INC.
Plant: Clifton, N. J.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK, N. Y.

to maintain and improve their quality in spite of large scale production. These efforts were largely successful. The general appreciation of good quality, rather than the new technics, is the most important lesson that we may learn from the German fruit juice industry.

References

1. German patent No. 680,602.
2. U. S. patent No. 1,932,833.
3. Vorratspflege und Lebensmittel faschungen 1, 183, 1938.
4. German patent No. 695,265.

—End—

Peanut Butter Improved

(*Continued from page* 110)

will be no free oil at the top for a week or more. Peanut butter packed in jars under 5 to 7 in. vacuum has less oil separation than that packed under atmospheric pressure.

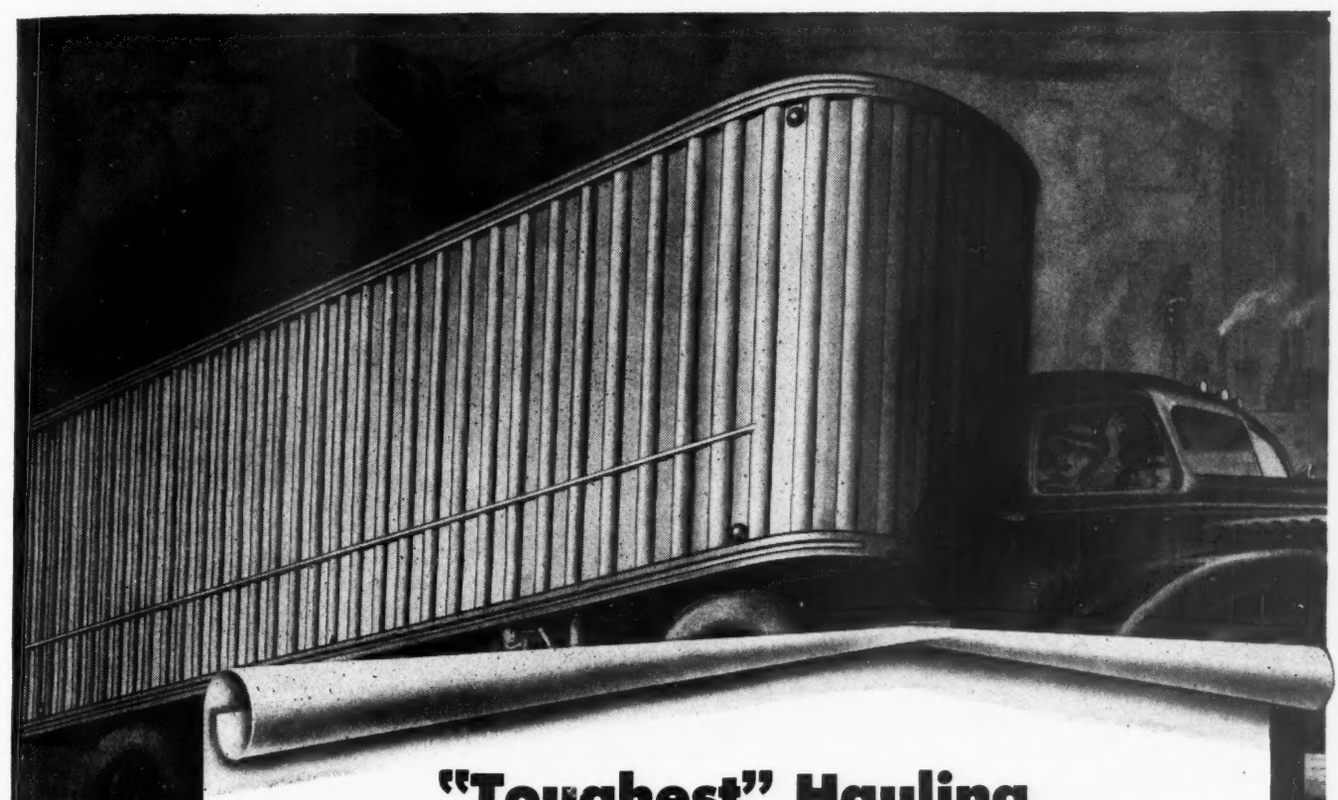
Firming Peanut Butter

The sticky, gummy consistency of normal peanut butter meets with objection from almost all consumers. Attempts have been made to change this consistency and produce firmness by the addition of numerous products.

Firming peanut butter and preventing oil separation are related in that materials which prevent oil separation usually produce firmness. Of five hydrogenated or naturally hard fats tested at 60 and 80 deg. F., the most desirable consistency was obtained when three percent hydrogenated peanut oil, cottonseed oil, or soya bean oil was added. A desirable consistency was also obtained by adding either 20 percent dried milk, 25 percent malted milk, or 25 percent of equal portions of sucrose and dextrose. Certain other foods, such as pickles, olives, preserves, and dried fruits, when ground with peanut butter in proportions of 20 to 30 percent, stiffened it, and imparted appetizing flavors, but made it too crumbly to be blocked and sliced or to be spread smoothly.

In Table II are listed 12 materials added to increase firmness, prevent stickiness, and facilitate slicing. Stiffness, increased for a week or more after the ingredients were added, during which time the oil was absorbed and equalized throughout the product. Storing under refrigeration (below 35 deg. F.) froze the oil and greatly retarded or prevented equalization.

Crunchiness was produced by adding crisp cereals, ground whole wheat toast, or ground vanilla wafers. There was only a slight improvement, however, in oil retention and the flavor was not improved.



"Toughest" Hauling

now MORE than matched by new corrugated van with

3 MAJOR STRUCTURAL IMPROVEMENTS

The *corrugated* Trailmobile is fast becoming *standard* for terminal and other *"trailer-killing"* operations!

Its sides, wherein rugged corrugations form a solid wall of sturdy posts, are famed for their outstanding body-strength. Now, Trailmobile uses corrugations to make a body 2 to 3 times stronger, throughout, than that of *any* other trailer-van!

A "folding back" of its sides makes them *doubly thick* all along both top and bottom, therefore *4 times stronger!* And *identical* rub-rails at both top and bottom are *double* ribbed, creating *double* the strength to resist impacts and protect the corrugations.

Its under-structure is that of the famed Smooth-Panel Trailmobile —with "distributing beams" that "spread" load-stresses, preventing stress-concentration. Its under-carriage is Trailmobile's standard—long accepted by the industry as the "easiest pulling"—nevertheless now still *further* refined and improved.

So for hauling considered "too tough" for *any* ordinary trailer, thousands insist on *only* this new corrugated model-CP Trailmobile—with its surprisingly low upkeep!

For instance, to replace damaged panels, you simply unbuckle the Lock-strip, "torch out" the damaged piece, weld in a new one, replace the Lock-strip. And, its plywood, when damaged, simply "snaps" into slots and is then "locked" to stop vibration by a special plywood Belt-rail!

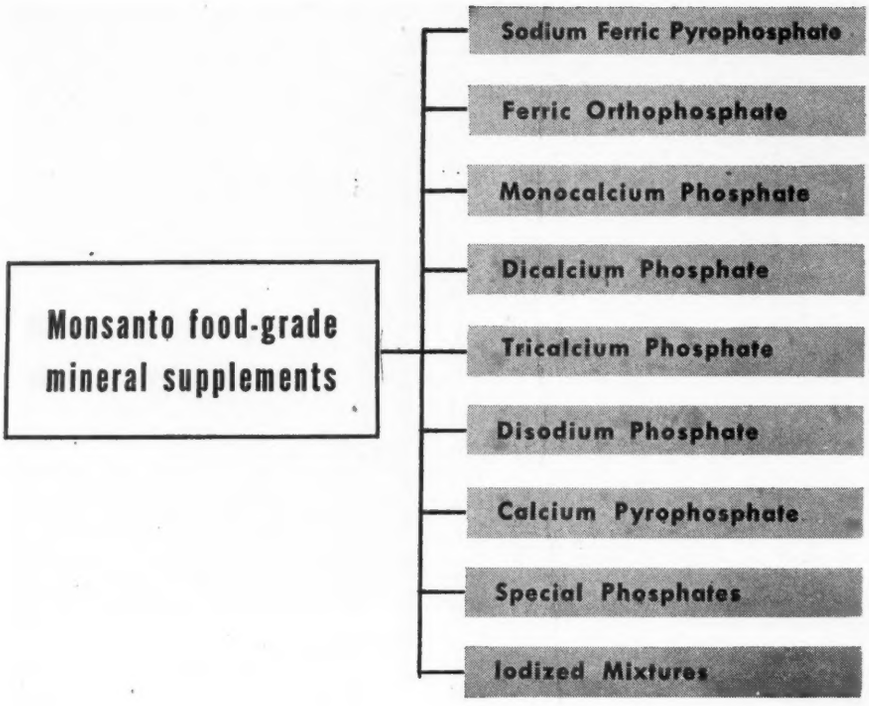
See this trailer at your near-by Trailmobile Branch. You'll like it. Or, write us. ACCEPT without obligation, complete literature FREE.

THE TRAILMOBILE COMPANY
Cincinnati 9, Ohio

TRAILMOBILE

Protecting its 105 Year Reputation
—71 "Homefolks" Service Centers

COPYRIGHT 1946, THE TRAILMOBILE COMPANY



answering the big question in food fortification

Food fortification is recognized as a necessary factor in diet and sales. The big question now centers on the purity of products used for food enrichment.

In Monsanto food-grade mineral supplements, the food industry has found the answer. Starting with elemental phosphorous that is better than 99.9% pure, Monsanto phosphoric acid and food phosphates carry the strain of purity into mineral supplements supplied by Monsanto to manufacturers and processors of enriched foods.

Monsanto is recognized as a source of valuable information on the entire subject of mineral supplements. For details, contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Cincinnati, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

Powdered hard candy and ground gumdrops were added but were considered less satisfactory than powdered sugar or dried milk.

Formulas

A number of formulas have been developed for making firm, flavored peanut butter. In using these the amount of mixing must be carefully controlled to attain desired firmness and prevent oil separation. Excessive mixing seems to mash the peanut particles, press out oil, and prevent firming, while insufficient mixing does not produce a homogenous product. After preparing and packaging, the product should be stored under moderate refrigeration (50 to 60 deg. F.) for a day or two to allow the oil to equalize.

When food coloring was added it did not mix evenly. Possibly oil soluble colors might be more satisfactory. Given here are several formulas that have been used successfully.

Orange Flavor

Roasted peanuts	7 lb. 2.4 oz.
Salt	3.5 oz.
Dextrose	2 lb.
Powdered sugar	8 oz.
Hydrogenated oil	1.3 oz.
Glycerine	0.8 oz.
Orange oil	0.4 oz.

Grind peanuts, salt and hydrogenated oil; hold at 150 deg. F. until oil is melted; add glycerine, then dextrose and orange oil; mix thoroughly; pack into molds or containers while hot.

Chocolate Flavor

Roasted peanuts	7 lb.
Salt	3.2 oz.
Powdered sugar	8 oz.
Dextrose	2 lb.
Cocoa	3.2 oz.
Glycerine	1.6 oz.
Vanilla	0.7 oz.

Grind peanuts and salt; add glycerine, then other ingredients and mix thoroughly; pack into molds or containers while hot.

Raisin and Other Fruit Flavors

Roasted peanuts	5 lb. 14.1 oz.
Salt	1.9 oz.
Dextrose	2 lb.
Raisins (chopped)	2 lb.
Cloves	trace

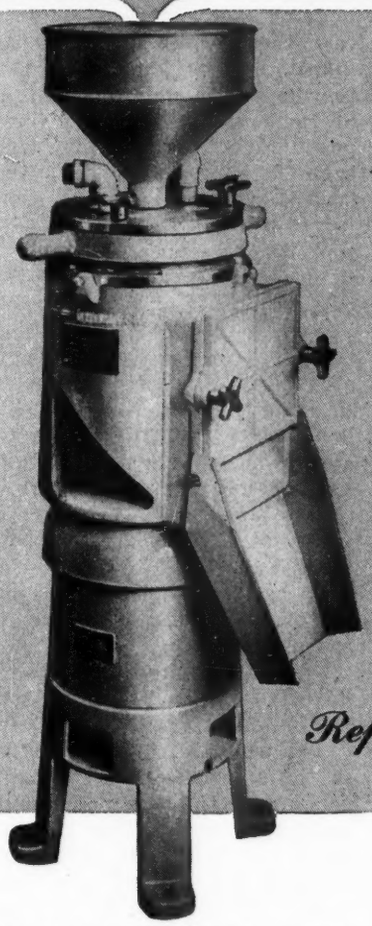
Mix salt and dextrose with peanuts thoroughly; grind to desired fineness; stir raisins into peanut butter and pack into molds or containers while hot. Chopped dehydrated figs, dates, prunes, and candied or glazed fruits may be substituted for the raisins.

Molding and Packaging

Peanut butter that has been firmed, and in which stickiness has been eliminated, can be molded, packaged and sliced, similar to butter, cheese, meat loaf, and other

ONE MOVING PART . . . SIMPLE IN DESIGN . . . SANITARY IN CONSTRUCTION

THE DOOR TO EFFICIENCY



SANITARY
HOMOGENIZING
EMULSIFYING
DISPERSING
GRINDING

Increased Production at Lower Costs

Definite Product Improvements are Reported by **PREMIER COLLOID MILL** *users*

"Definitely improved both quality and life of our product" . . . "Increased production 15% without added labor" . . . "Greater capacity per HP consumption" . . . "Test samples superior" . . . "We no longer have packing-gland trouble or product contamination" . . . "No internal corrugations to cause unsanitary conditions" . . . These actual quotations are typical of performance reports from food processors using Premier Colloid Mills.

Whether the work to be done is emulsifying, dispersing or disintegrating . . . whether the material to be improved is liquid, paste or solid, every Premier installation is a proof of successful processing. Finer particle size is an important factor in finer products. Moreover, compulsory treatment of every particle assures uniform standards of quality. A partial list of fields which benefited from these results:—

Mayonnaise; salad dressing; mustard, extractions; fish and meat pastes; nut and vegetable pastes; soup compounds; baking compounds; ice cream compounds; baby foods; tomato juice, fruit juices; stable emulsions of essentials oils in water or syrups; reconstituted milk and cream; raw, uncooked fruits; cream cheese; peanut butter; meat sauce; cocoanut, soya beans; and many others. (Special laboratory models are available for research work.)

Where a new process is involved and performance data desired, a test run may be arranged. Premier Mill Corporation, Factory and Laboratory, Geneva, N. Y.; General Sales Offices, 110 East 42nd Street, New York 17, N. Y.

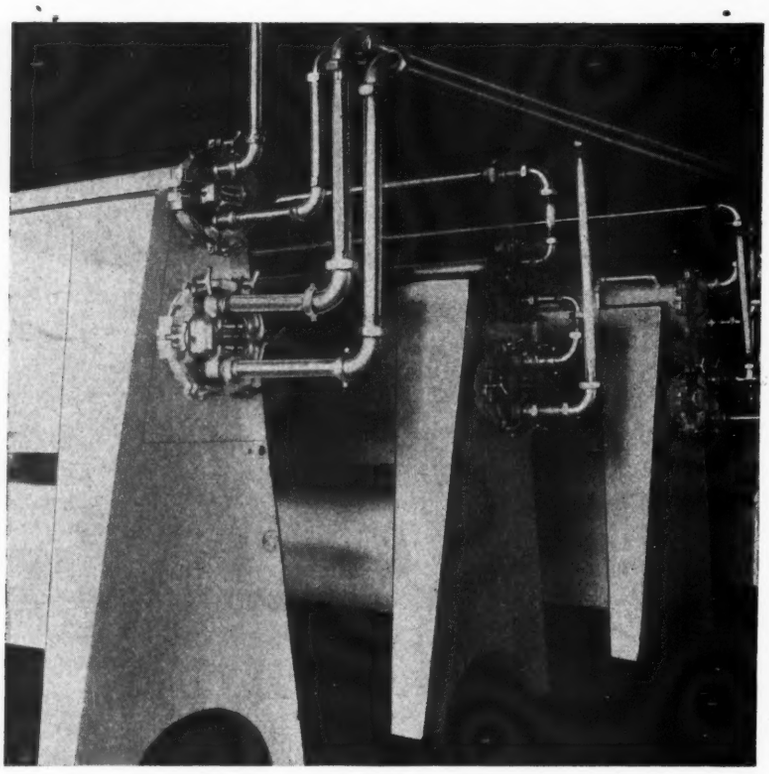
Descriptive Literature on Request

THE PREMIER MILL

Better products more profitably processed

CRCO CONFIDENCE
... born of experience

Pre-Heaters



Built To Meet the Exacting Demands of Severe Operating Conditions

These Pre-Heaters have proven themselves under most trying conditions when plants were flooded with red-ripe tomatoes which had to be processed at once. The automatic temperature controls kept a constant temperature regardless of the amount of flow and the CRCO method of distributing the product in a rapidly-moving layer insured against overheating, scorching or burning-on. CRCO Pre-Heaters are faster . . . require less handling of product . . . are more sanitary and easier to keep clean . . . have more constant heat . . . and temperature controls are positive.

Send for special Pre-Heater Bulletin showing the various sizes . . . as well as other outstanding equipment for Juice Lines.

THE BEST OF Everything

CHISHOLM-RYDER
Niagara Falls, New York
FOR · THE · FOOD · PROCESSOR

foods. With slight modification it may be wrapped in packages suitable as a confection.

Obtaining a suitable waterproof, greaseproof, rigid and rectangular package that can be sealed to prevent oil from "crawling" through the seal, has been very difficult. Pliofilm, laminated foil, or specially coated cellophane or parchment were satisfactory for packaging molded peanut butter when prefabricated bags or sheets were used. In either case, the package must be completely sealed. It was found most satisfactory to fit the container into a mold of the desired size, pack the warm peanut butter into it, then fold and seal. The peanut butter was then cooled, removed from the mold, and inserted into a rigid paperboard carton. The warm peanut butter can be packed in larger molds, hardened, cut, wrapped and sealed.

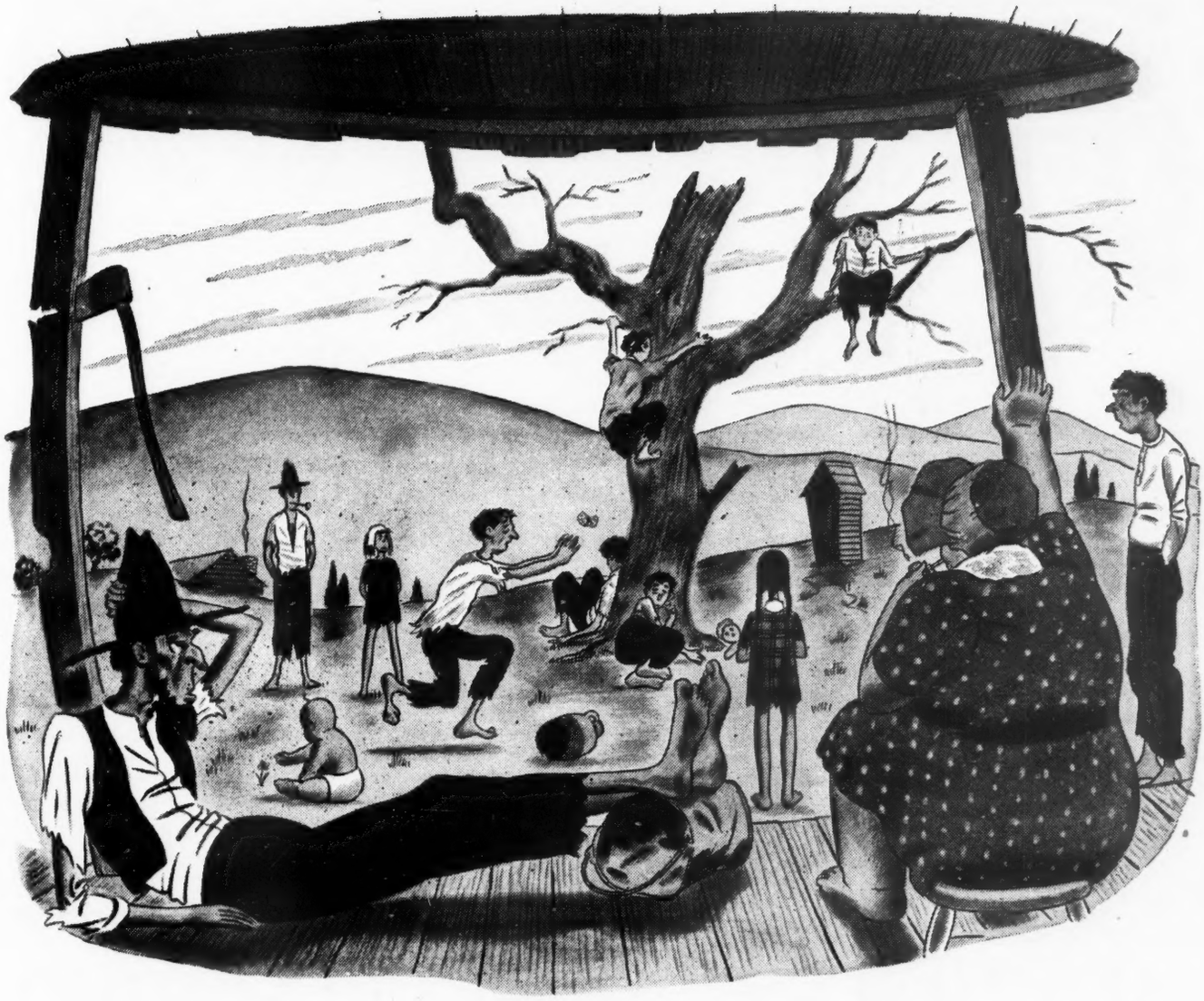
Data in Table III show the relative keeping quality of seven types of molded, flavored peanut butter, together with a control lot, when held for 28 days at 100 deg. F. The appearance of none of the lots was greatly affected by storage. That containing raisins was dry looking while that with pickles had lost attractiveness due to the brown color that had developed in the pickles. The unflavored samples, as well as those containing orange, chocolate or malt had an oily surface. The flavor of that containing orange or raisin was fresh.

The percent free acid was highest in the sample containing chili. According to the peroxide number, no samples were definitely rancid, since 10 to 15 milli-mols of oxygen per kilogram of oil indicated only the beginning of rancidity. The addition of ingredients had little effect on oxidative rancidity.

Improving Spreadability

Spreadability of peanut butter varies with the kind of peanuts used. Spanish and Runner peanuts presumably make an "oilier" and softer peanut butter than Virginia peanuts. The ease of spreading is also influenced by the fineness of grinding, as very coarsely or very finely ground peanut butter does not spread as well as that ground moderately fine. But, in any case, the normal stickiness makes spreading difficult.

The spreadability may be increased by the addition of ingredients as shown in Table IV. Lecithin increased spreadability but aggravated oil separation. As with the addition of materials to produce firmness, ingredients added to increase spreadability tend to dilute the peanut flavor. In evaluating almost 100



"Maw, don't ye sometimes hanker for suthin' to happen?"

The above is as good a cue as any to give you an important angle on Crown cans. Do you ever stop to think what happens to the wide array of products that are packaged in Crown cans? . . . Nothing . . . Nothing happens because products entrusted to Crown cans are safe. Crown cans—airtight, lightproof, sturdy—protect flavor, color and quality, from the time the products are packed until the time they are used. This angle is mighty important to your customers, too.

CROWN FINE METAL CONTAINERS

CROWN CAN COMPANY • PHILADELPHIA • Division Crown Cork & Seal Company, Inc. • Baltimore, Maryland

possible flavoring materials it was decided that an added flavor must be as acceptable as peanut flavor for its addition to be worthwhile.

Additions to peanut butter to aid spreadability include water in considerable quantity, which causes the product to spoil unless it is sterilized, used immediately, or stored under refrigeration. Heating usually causes the oil to rise to the surface, destroys the spreadability, and impairs the appearance.

—End—

Plant Sanitation

(*Continued from page* 96)

sanitizers, however, should be used with caution because many have been found to be deficient, both as detergents and as sanitizers. There are several cationic compounds, which, when mixed with certain detergents, offer marked possibilities as detergent sanitizers, but have limited practical applications. Use of the much publicized penicillin appears to be confined to its medical applications, where it is effective as an antibiotic agent. Chlorellin, a new member of the penicillin family of bacteria inhibiting compounds, is an unusual germicidal agent in that it synthesizes its food out of natural raw materials. Much research work, however, is necessary before the importance of these antibiotic agents in sanitary practice can be properly evaluated.

Certain quaternary ammonium derivatives have been advocated for use as sanitizers in food-production plants. Among these, alkyl dimethyl benzyl ammonium chloride (known commercially as "Rossal") and certain fatty acid esters of colamino formyl methyl pyridinium chloride (known commercially as Emulsept) have attracted the serious attention of health authorities. Because the conventional phenol coefficient method of evaluating germicidal power sometimes gives widely divergent and deceptive results, the effectiveness of these ammonium derivates has not been fully evaluated. There are many obvious advantages to be claimed for such compounds, but food plant operators can justifiably be conservative in using them until more definite knowledge is available concerning their performance.

Until this newer knowledge of sanitizers is more fully determined and understood, hypochlorites and chloramines probably will continue to be widely used. Their utility will be greatly increased when advantage is taken of supplementary conditions

FERRY CONTINUOUS POTATO CHIP MACHINE

is completely automatic! Automatic from raw, unpeeled potatoes to finshed product. Peeling, slicing, washing, drying, frying and salting . . . all are under perfect control. You can't beat a Ferry Potato Chip Machine.

Also makers of

SLICERS AND AUTOMATIC SLICERS, FEEDERS AND CAN WASHING MACHINERY

J. D. FERRY CO.

129 SO. CAMERON ST.

HARRISBURG, PA.

WATER FOR FOOD PROCESSING STERILIZED BY BREAK-POINT CHLORINATION

INDUSTRIAL DIVISION

WALLACE & TIERNAN

NEWARK 1, NEW JERSEY

REPRESENTED IN PRINCIPAL CITIES

An Independent

· Laboratory

to meet the needs of your Organization

WE are eager to have your firm as one of our many clients and will be glad to advise you (without obligation on your part) as to how we can assist you in many matters requiring the work of an independent laboratory of established reputation and broad experience.

Food Analysis

VITAMIN DETERMINATION

Biological
Microbiological
Chemical

NUTRITIONAL STUDIES—RESEARCH

PRODUCT DEVELOPMENT

BACTERIOLOGICAL STUDIES

CONSULTATION

Labelling
Advertising

LEBERCO LABORATORIES

36 Roosevelt Avenue, Bloomfield, N. J.

to protect popcorn

It's SYLVANIA for Cellophane!

...and pie

...and ham-on-rye!

BEAUTIFUL, YES! But Sylvania Cellophane offers much more than beauty to the products it packages. This shimmering wrap protects against air, dust and moisture... seals flavor and freshness in... keeps candy, pastries, frozen meat, cigarettes and many other products in tip-top condition.

Today's Sylvania Cellophane not only looks better than ever before, but it offers broader, functional qualities, too. As time goes on you can expect even larger quantities to be made available for an even greater variety of packaged products.

SYLVANIA CELLOPHANE

Made only by SYLVANIA INDUSTRIAL Corporation

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 122 E. 42nd St., New York 17, N.Y. ★ *Plant and Principal Office:* Fredericksburg, Va.

SYLVANIA CELLOPHANE

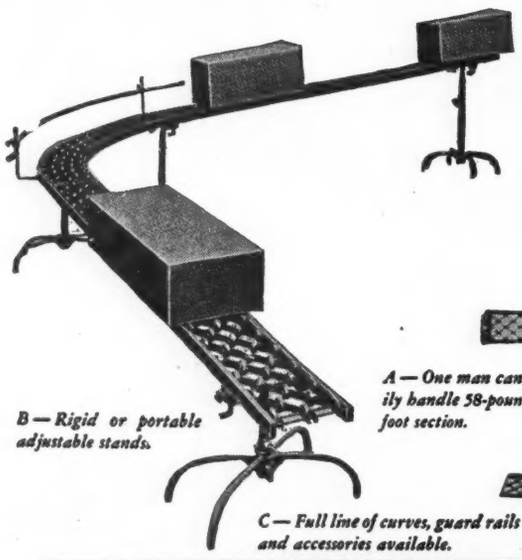
•Registered Trade Mark

STANDARDIZED
MATERIALS HANDLING EQUIPMENT

LOAD-VEYORS
SEND FOR LOAD-VEYOR MANUAL No. 1004MH

A MAGIC CARPET FOR INDUSTRY

Load-Veyors combine great strength and light weight. Exclusive Market Forge features . . . grid construction supports ball bearing rollers on both sides . . . hardened inner and outer ball bearing races minimize wear . . . Load-Veyors may be used on either side . . . rails on reverse side provide for safe conveyance of small packages.



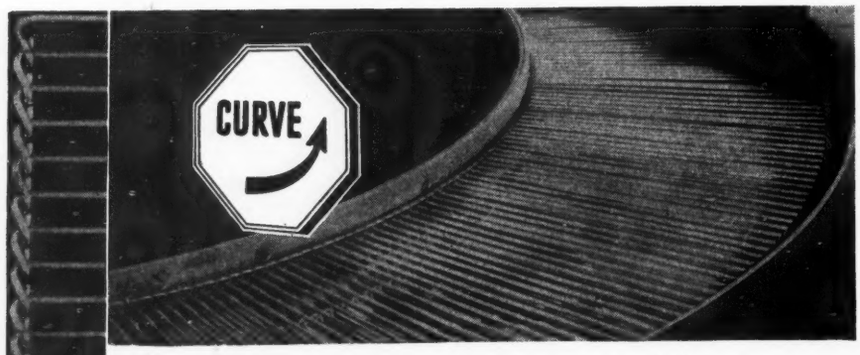
B — Rigid or portable adjustable stands.

A — One man can easily handle 58-pound 10 foot section.

C — Full line of curves, guard rails and accessories available.

Write for name of nearest INDUSTRIAL DISTRIBUTOR who stocks this equipment.

MARKET FORGE COMPANY, 87 GARVEY ST., EVERETT 49, MASS.



Curves are easy with a
CYCLONE FLEX-GRID CONVEYOR BELT!

TURNTABLE OPERATIONS are reliable and efficient where a Cyclone *Multi-Pitch* Flex-Grid Conveyor Belt is used. The use of sprockets permits a positive drive, free from slippage and belt stretch. Cyclone Flex-Grid is ideally suited for the continuous processing of baked goods and of such frozen foods as apricots, peaches, and apples. Smooth, round wires can be readily cleaned of clinging particles and juices. For over 25 years, Cyclone has been making metal conveyor belts for industry. This extensive experience is at your service. Offices in principal cities . . . factories in Middle West and on Pacific Coast. Write for *free* catalog No. 3.

CYCLONE FENCE DIVISION · American Steel & Wire Co. ★ USS CYCLONE METAL BELTS ★ UNITED STATES STEEL

By the makers of Cyclone Fence

CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept. H-46, Waukegan, Illinois
United States Steel Export Company, New York

UNITED STATES STEEL

that will make their maximum germicidal action possible. In the food processing industry, new products are forced to run the gauntlet of exhaustive testing before they are widely used. Otherwise, an unknown toxicity or any poorly understood condition of application may result in unfortunate and costly experiences.

The important consideration is the urgent need for a technology of sanitizers. Only in that way can their merits and limitations be fully evaluated and understood. A basic principle in food plant sanitation is that physical and chemical cleanliness is a necessary prerequisite to any effective form of antisepsis. It is a principle that must be strictly followed. The groping for detergent sanitizers can result in dangerous theories and undo many of the gains attained in sound sanitary control practice. Again we plead that the "chore" be taken out of sanitary practice and that an understanding of the basic principles involved be provided, so that the practice followed will be consistent with technical knowledge and not in accordance with the "happenstance" of habit and assumption.

Effective cleaning of food processing equipment and utensils is not attained by the mere use of washing compounds and chemical sanitizers. The primary purpose of any cleaning or detergent composition is to prepare the dirt, soil, adhering solids, grease and possible extraneous materials for their subsequent detachment from the food-contact surfaces and their final elimination by rinsing. Once we have attained that objective, our next concern is to prevent contamination of the cleaned surfaces prior to their use. In that connection, sanitizers are the preventive chemicals, whereas cleaners are the corrective ones. Although a combination of both functions in one product may be possible, attainment of maximum properties by such a combination is debatable. In the final analysis, no product will be any better than its application.

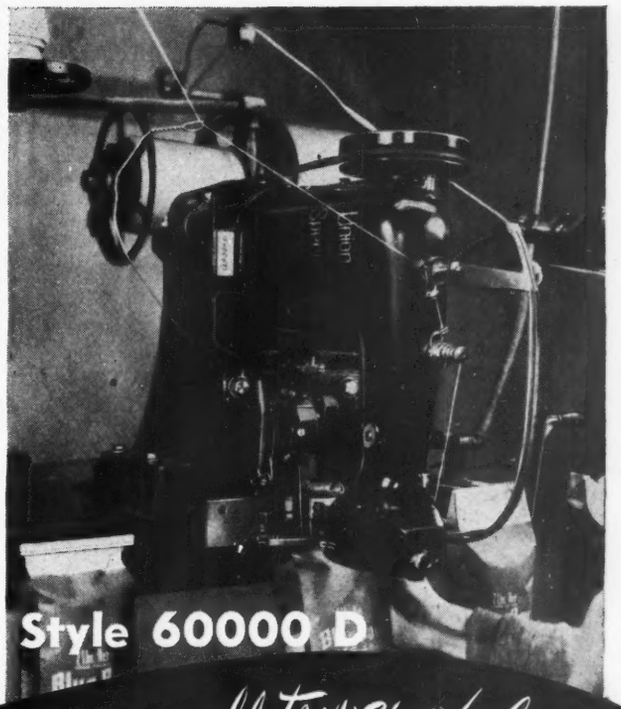
Attempts to minimize the human equation by the substitution of inanimate chemical products suggest that the effort involved is not worth the expenditure. For that defeatist reason, if for no more convincing one, sanitary control practice should be elevated from the category of menial labor to the level of a technology that answers such questions as:

1. What specific procedure and materials should be used?
2. Why should that specific procedure and those materials be used?
3. How should such procedure and materials be used?

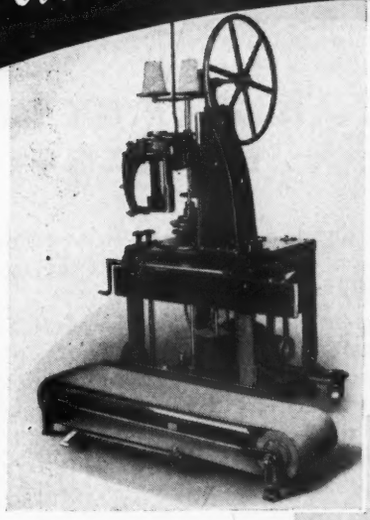
Packaging in Small Paper Bags

The *right* type of closure adds merchandising value to the small paper bag. That means a Union Special Dubl-Tape Closure. Install a UNION SPECIAL STYLE 60000 D sewing head in your packaging department and watch results! The method is fast and economical; the machine is easy to operate, adjustable to a wide range of bag sizes; compared to other bag closing equipment, the investment is modest.

The DUBL-TAPE CLOSURE, sewed with strong stitches through the double safety of two strong paper tapes, makes the small paper bag a neat, sturdy, good-looking package. It is inexpensive to produce and can be used on filled bags up to 25 lbs. size.



newer, better methods of closing all types of bags

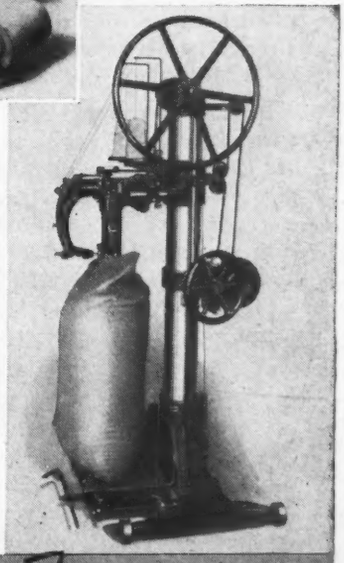


Style 21800 C
is for closing cotton, burlap and paper bags. Designed for mounting Class 14500 medium duty or 80600 heavy duty sewing heads. Independent or synchronized conveyor belt travel. Sewing head and conveyor adjustable vertically.

Closing Larger Paper and Fabric Bags

Machines for closing *all* types of fabric or paper bags are in the Union Special line, including sewing heads, columns, tables, conveyors and accessories. Combination installed to meet any requirement.

Write for Bulletin No. 200
UNION SPECIAL MACHINE COMPANY
450 North Franklin Street, Chicago 10, Illinois



Style 20100 D
is for general utility duty. Has Class 14500 sewing head and floating bag carrier which returns automatically to its loading position when closed bag is removed. Carrier and sewing head both adjustable vertically. Portability makes unit popular.

Union Special *Bag Closing Machines*

Custom Built

STAINLESS STEEL EQUIPMENT....

...is ONLY AS GOOD AS ITS FABRICATOR

From the minute you decide on a made-to-order stainless steel vessel, you're in the hands of a fabricator. In fact the selection of your fabricator is generally one of your big problems.

It's more than a question of following blueprints. Stainless steel is a difficult alloy to work. It "acts up" during fabrication. In cutting, forming, welding and even in finishing, your fabricator must know how to guard the corrosion resistance and strength of the alloy. His plant must be specially equipped for working with stainless steel. The longer his experience, the more help he'll give you in building vessels that meet your requirements.

We work exclusively with stainless steel and alloys. Our plant is specially tooled to fabricate this metal. Our engineers and mechanics are particularly trained for the work. Why not consult us when you plan your next stainless steel vessel?

S. BLICKMAN, INC. • 4184 GREGORY AVENUE • WEEHAWKEN, N. J.

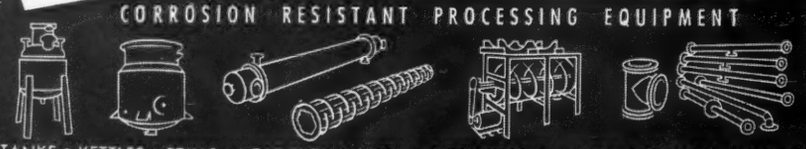
ARMY E NAVY

S. BLICKMAN, INC.
Guards Alloys in Fabrication

SEND FOR THIS VALUABLE BOOK

A request on your letterhead will bring our guide, "What to Look For When You Specify Stainless Steel for Your Processing Equipment."

CORROSION RESISTANT PROCESSING EQUIPMENT



TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

Baking With New Flour

(*Continued from page 77*)

percent extraction flour, the greater will be the departure of these qualities from normal for the regular baker's patent flour. The more bran and germ in the 80 percent flour, the greater will be the amount of enzymes originally present in the wheat, which cause deterioration in gluten quality. It will probably be quite possible for the baker to use the ash content in discussing flour quality with the mills. This is no time to discard the time-honored ash determination.

Protein normally should be higher in the 80 percent extraction flours than from 72 percent in the same type wheat, but, again, wheat quality, milling experience and equipment will play their parts in determining the magnitude of this increase. The over-all situation, as regards wheat supply, is such that the baker will have little opportunity to establish protein content of the 80 percent extraction flour on any reasonable basis of comparison with past practice in flour purchasing. Indeed, as the end of the present crop is reached there may be a serious falling off in protein content of baker's flour.

Diastatic Activity May Change

The ability of a flour to maintain adequate gas production during fermentation of the sponges, through the production of fermentable carbohydrates and to convert starch to sugar during the fermentation of the straight doughs, is determined by what is commonly known as diastatic activity, although this should be broken down into alpha and beta amylase strength. Some advance reports have indicated the "gassing power," which is an indication that the effect of diastatic activity is much higher in the 80 percent extraction flours and, therefore, it has been suggested the bakers check to supplement the natural ability of the flour to form sugars for fermentation of the dough. As the data on this activity are released by laboratories, it will probably be found that the gassing power of the 80 percent extraction winter wheat flours has not increased materially. The winter wheat flours have always lower natural activity than the spring wheats and experience has indicated it is necessary for the mills to add malted wheat or barley flour to bring the flour they produce up to the requirements of the baking industry, as outlined in flour specifications or by

1 2 3 4 FACTS ABOUT CORK

FOR LOW TEMPERATURE

Mundet district offices are located in these cities:

ATLANTA
339-41 Elizabeth Street, N.E.

BOSTON
57 Regent St., North Cambridge 40

BROOKLYN 11
65 South Eleventh Street

CHICAGO 21
135 West 63rd Street

CINCINNATI 2
427 West 4th Street

DALLAS 1
505 Southland Life Annex

DETROIT 26
335 West Jefferson Avenue

HOUSTON 1
Commerce and Palmer Streets

JACKSONVILLE 7, FLA.
1212 Mary Street

KANSAS CITY 7, MO.
1428 St. Louis Avenue

LOS ANGELES 31
1850 North Main Street

NEW ORLEANS 16
315-25 N. Front Street

PHILADELPHIA 39
856 N. 48th Street

ST. LOUIS 4
2415 South Third Street

SAN FRANCISCO 7
440 Brannan Street

In Canada:
Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

THERE'S NOTHING LIKE CORK

Cork is one of the most useful materials known to man. Not only has it been in service longer than history can record, but its use has greatly increased with the need for modern industrial efficiency and economy. The reason for this is that Cork is completely unique in its physical structure and qualities. There's *nothing* like Cork!

For low temperature operation, here are four facts to remember:

1. Cork is MONEY-SAVING! Millions of dead-air cells in every square inch of Cork insulation cause it to serve as a most efficient *natural* barrier to heat flow. By its use, refrigeration is conserved to the most practical limits.

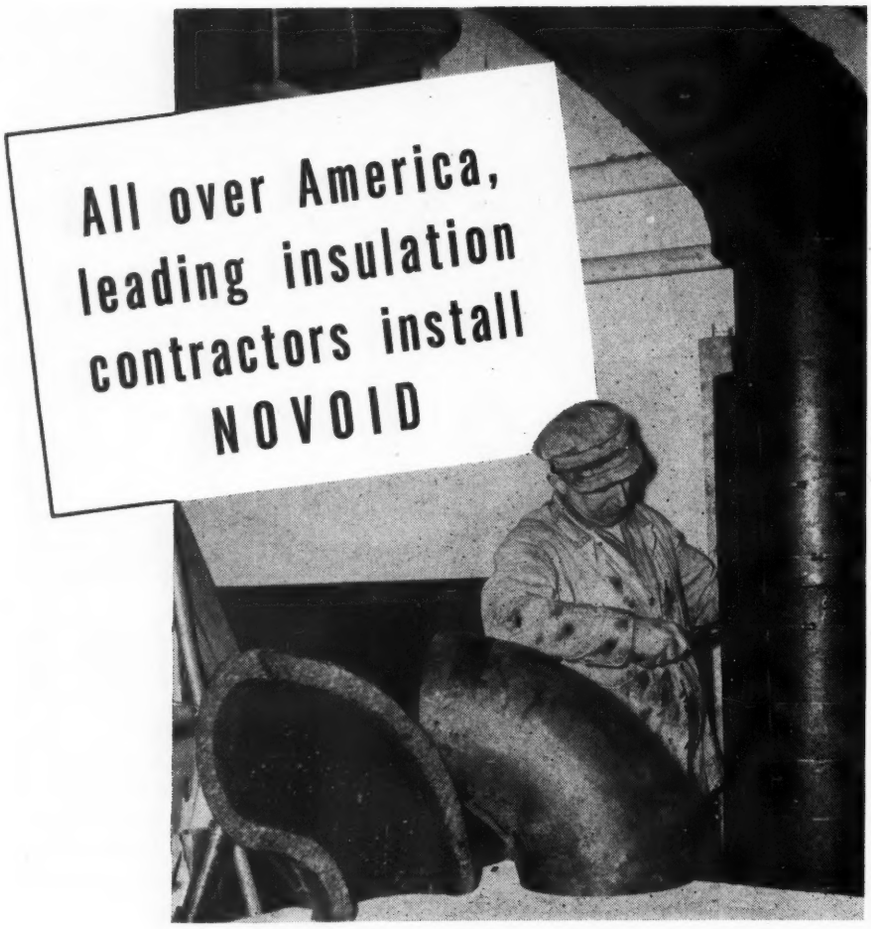
2. Cork is LONG-LASTING! Cork has a high degree of stability; is a most durable material. It continues to serve for many years at highest efficiency.

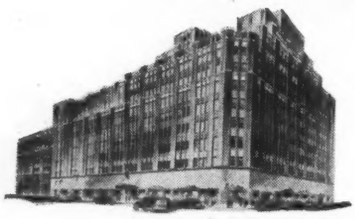
3. Cork is TIME-TESTED! The use of Cork insulation has kept pace with the development of refrigeration and cold storage. Its wide acceptance in these "heavy-duty" industries is due to its proved record for more than 40 years.

4. Through 80 years as Cork Specialists we are able to preserve Cork's natural advantages in Mundet insulating products. Mundet engineers offer responsible assistance in building or expanding low temperature facilities. Let us help you secure low operating cost and maximum service. Mundet Cork Corporation, Insulation Division, 65 South 11th Street, Brooklyn 11, New York.

MUNDET CORK INSULATION

CONSERVES LOW TEMPERATURE





● Mechanic for Robert A. Keasbey Company, New York City, installing ice water thickness Novoid Cork Pipe Covering on 12" lines of air conditioning system for Abraham & Straus, Brooklyn, N. Y., nationally-known department store. The A&S store is shown as it will appear when new addition is completed.

YOU CAN NOW GET Novoid Cork Pipe Covering promptly through America's outstanding insulation contractors. In New York, the Novoid distributor is the Robert A. Keasbey Company, one of the oldest and most widely experienced firms in the business.

Novoid Covering is the moulded rigid insulation that efficiently reduces your cost of refrigeration. It snugly hugs pipes and fittings of every size and shape, does not sag, does not absorb moisture or odors, and is long-lasting.

For complete facts about Novoid Pipe Covering, Corkboard, and sundries specially developed to make low-temperature insulations most efficient, write to Cork Import Corporation, 330 West 42nd Street, New York City.

NOVOID INSULATION

CORKBOARD ● **PIPE COVERING**

common practice. Therefore, the gassing power of the winter wheat flours can be maintained at the old levels, for if it is found the 80 percent extraction results in higher natural diastatic activity, it will be a simple matter for the mills to cut back the diastatic supplement. The natural sugars of the 80 percent extraction flour will be higher. This will be reflected in better crust color of the bread produced from formulas low in sugar.

The same is true, more or less, in the case of spring wheat flours. Gassing power of some of the 80 percent extraction flours has been extremely high, but this can be for reasons other than the fact that the flour is longer extraction, in the use of sprouted wheat, for example. Because of the higher natural diastatic activity of the spring wheats there will be more variation than in the winter wheat flours and some will tend to run excessively high. When such a condition exists, sponges made with spring wheat flours will tend to age more over a period of time. Increase in temperature will be greater and an ultimate lower acidity will be reached.

In general, the diastatic malt requirements as far as alpha amylase (sugar forming) activity is concerned, will be the same as with the 72 percent extraction flours previously used. Each baker will have to determine whether or not diastatic malt is required for other reasons, particularly proteolytic activity or reducing action resulting in the activation of flour proteinases. It will depend on the type and brand of flour, formula, and individual processing technic and shop equipment. The function of diastatic malt sirup should be very carefully reviewed before it is eliminated from the formula.

Use of the Farinograph

The amount of liquid required to produce from a flour a dough of uniform consistency can be accurately determined by the Brabender farinograph. Thus, a very definite report can be made of the percent water or absorption required to produce from a flour a dough developed to the maximum at 500 or 600 units or any other arbitrary consistency. This method of determining absorption shows the 80 percent extraction flours require more water to produce a dough of the same consistency as the 72 percent or average extraction flour formerly used. An incorrect interpretation of these results would be that the absorption of the 80 percent flours, as they are used in the bakery, would be higher. This is not

Our word, "planalized," may sound like Harlem jive to you. But we coined and use it in the most earnest seriousness.

"Planalized" means that Rossotti Consultants first sit down and *plan* with you your labeling and packaging objectives. Then our research men go into your selling field — survey your competition problems at the point of sale — and our merchandising experts *analyze* the findings.

It's only then that our designers and artists go to work. This gives you, in your labels and packages, that distinctive Rossotti artistic touch which is solidly grounded on practical merchandising principles. The result is a label and package that *sells itself from the shelf!*

May we bring some of these up-to-the-minute, point-of-sale, selling ideas to you? Just call or write us — and discover how much worth while that is!

Rossotti
SINCE 1898

ROSSOTTI LITHOGRAPHING CO., INC. • NORTH BERGEN, N. J.

BOSTON 9, Mass.: 200 Milk Street • ROCHESTER 4, N. Y.: 183 Main Street, East
JACKSONVILLE 2, Fla.: 1106 Barnett National Bank Building • CHICAGO 11, Ill.: 520 North Michigan Avenue
ROSSOTTI WEST COAST LITHOGRAPHING CORP., 255 California St., San Francisco 11, Cal.

IMPROVE FOOD CONVEYING SANITATION

WITH PlasTex

THE PLASTIC COATED BELTING

● Cleanliness! That's the keynote of modern food handling. That's why this wonderful PlasTex Belting fills an important need for a really sanitary food conveying belting. Yes, this fully pliable plastic coated belting is impervious to oils, greases, acids, alkalis and moisture. It can carry hot or cold, wet or dry substances month after month without picking up odors. Best of all, it's easy to keep clean—and wears many times longer than uncoated beltings.

Join the hundreds of leading food processors already enjoying the benefits of this "modern miracle" in belting. Ask your jobber!

BUFFALO WEAVING & BELTING COMPANY

Chicago Buffalo 7, N. Y. New York

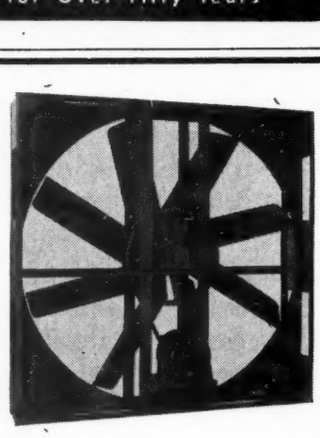
Serving Industry for Over Fifty Years

WANT WORKERS?

Get a . . .

Coolair TRADE MARK

EXHAUST FAN



If you want to . . .

(a) Keep present employees

(b) Attract new employees

(c) Develop *more productive* workers

BREEZE-CONDITION your work-rooms and offices with a big quiet, COOLAIR EXHAUST FAN!

Fresh cooling outside air, constantly moving, stimulates workers, keeps them mentally alert and boosts the quality and amount of work produced.

Right now many sizes of Coolair fans are available promptly, but when warm weather comes deliveries might be slow.

ACT NOW!

Call in your Coolair dealer or agent for a survey of your plant or write us for information.

ENGINEERS and ARCHITECTS
For descriptive and technical data see:
SWEET'S CATALOG (Architectural File)
A.S.H.V.E. GUIDE
ELECTRICAL BUYER'S REFERENCE

AMERICAN COOLAIR CORPORATION

"Pioneer Manufacturers of V-Belt Drive Exhaust Fans"

3604 Mayflower Street Jacksonville 3, Florida

true, however, for such consistency tests do not take into consideration the softening effects of the dough, resulting from enzymatic actions during fermentation and processing.

Baking tests, which take into consideration dough handling properties, are necessary to determine the relative absorption qualities. With the few flours studied, these show that 80 percent extraction flours tend to require slightly less liquid to produce a dough that handles properly through the shop. For best handling, the sponges should be on the stiff side, otherwise softening during fermentation will result in difficult handling of the sponges as they are manually returned to the mixer.

Addition of Yeast Foods

Undoubtedly the millers, knowing that the longer extraction mill streams have greater proteolytic activity, will bleach more heavily with Agene (the maturing bleach commonly used) and Novadel, in order to minimize difficulties in proper dough development confronting the bakers. This heavier bleach will be applied to the additional mill streams, which have to be included in the 80 percent flour, but will not be sufficient to obtain the maximum performance of a flour from the baker's viewpoint. The additional bleach will be helpful but no amount will equal the effect of certain oxidizing agents such as potassium bromate, the dough improver present in commercial yeast foods. Some mills, realizing this, have decided to add bromate to family flours and, in some cases, to their regular production of bakery flours. This will cause confusion, as far as the baker is concerned, for a situation may develop whereby he will have some flours bromated and others not. The baker must be his own judge of whether or not flours will handle better and produce better quality bread with bromate added as such by the mills or whether he should add additional bromate in the form of more yeast food, or use a yeast food containing a higher amount of bromate.

It has been customary in the past for the baker to vary yeast food to suit peculiar flour conditions. This will again depend on the quality of the 80 percent flour; some will require very little adjustment of oxidizing agents. No definite statement can be made to cover the large number of flours of widely different quality of 80 percent extraction that will be produced. At best, the addition of bromate will be a critical factor and will have to be carefully studied both by the mills and by the baker.

You can protect even pectin from contamination ...with INCONEL* evaporators

LONG TUBE VERTICAL evaporator used in concentrating pectin liquor. Designed and built by *Swenson Evaporator Division, Whiting Corp., Chicago,* the unit is constructed wholly of Inconel and Lukens Inconel-clad steel.

Corrosion may occur in evaporators *... yet no one may be aware of it.*

Not, at any rate, before product flavor, color and purity have been affected.

As food processors know, pectin is highly sensitive to metallic contamination. Accordingly, evaporators used in concentrating pectin liquor require a material with better-than-average ability to withstand corrosive attack.

Inconel has this ability. In actual service . . . as well as in extensive laboratory and field corrosion tests . . . Inconel provides virtually complete protection against corrosion by organic acids in foods.

Because of its resistance even to hydrochloric acid conditions encountered in pectin processing, Inconel is recognized as an outstanding material of construction.

Additional properties of this strong, rustproof metal make it particularly suitable for many other types of equipment used in the handling, processing and storage of food products.

Inconel is resistant to wear and abrasion. Commonly used cleansing agents and detergents do not damage it. Moreover, Inconel possesses excellent fabricating and welding qualities, and makes possible the construction of extremely strong, durable and lasting equipment.

Technical Bulletin T-7 contains further information on the *Properties and Uses of Inconel.* Those interested in reducing metallic contamination of food products, including fruit juices and alcoholic beverages, will find it worthwhile to have a copy of this bulletin handy for reference. Write for it.

*Reg. U. S. Pat. Off.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

INCONEL

STAINLESS STEEL STORAGE and PROCESSING TANKS

INCREASE PRODUCTION and EFFICIENCY IN YOUR PLANT WITH THESE SPECIALIZED TANKS

Metal-Glass San-I-Tanks give you safe, clean and rapid handling of any chemicals or liquids. These modern tanks are constructed throughout of 18-8 Stainless Steel making them immune to all acids and exceptionally easy to keep clean.

Tanks are finished with No. 4 polish on inside and bright finish outside. All Stainless Steel welded with inside welds ground smooth and polished.

San-I-Tanks incorporate special self-draining features with specially formed bottoms sloping to the front.

Built by tank specialists, San-I-Tanks incorporate every time saving, money saving feature. For years of trouble free service insist on San-I-Tanks.

MANY SIZES IN STOCK — READY FOR IMMEDIATE SHIPMENT

We endeavor to have a supply of stock sizes in San-I-Tanks on hand at all times. We have a tank for every application and in any size you need. Write us giving complete data on the size tank you need and we will, in many cases, have the tank in stock.

LET OUR ENGINEERS SOLVE YOUR SPECIAL TANK PROBLEMS

In addition to our complete line of stock sizes in San-I-Tanks which are stocked for immediate shipment, we also manufacture special sizes built to your requirements. If you have a special tank problem get in touch with us and our engineers will be glad to give you their suggestions. No obligation of course. If it's a tank problem we can solve it for you. Over 20 years of tank building experience backs the San-I-Tank so play safe and work with a tank specialist.

Write for Complete Literature and Prices

Metal-Glass Products Co.

Dept. FI. Belding, Michigan

The question of keeping quality of the flour is one that must be intelligently examined.

Factor of Storage

The new flours will be more heavily matured by the mills with the customary bleaching agents in order to minimize the difficulties that the baker may experience. Even spring wheat flours, which normally required very little, if any, maturing bleach, will be bleached heavier than usual. Long storage will not improve the baking qualities of the flour. It will be so heavily bleached that it can be used immediately. Only bromate or more yeast food can bring out the maximum qualities inherent in a flour of 80 percent extraction. Obviously, color will not be improved by long storage time. The yellow carotene color will be removed practically entirely by the heavy maturing bleach. It is thus evident that no beneficial results will be obtained by holding flour in storage a long time. Indeed, WFO 144, which limits inventories to 30 days, eliminates any program of long storage of flour that any baker may have felt was necessary in the past. Care should be exercised in handling flour supplies so that none of it is in storage over 30 days. This will minimize any danger of insect infestation, which may be a greater problem than with the shorter extraction flours that have been used in the past. Further, some of the 80 percent flours will not improve in flavor during long storage. Rather, they will tend to develop a bitterness that will be objectionable in bread produced from them.

Fermentation Time

No change in fermentation time is indicated. The gas production in sponges, provided no sprouted wheat has been used in the milling of the flour, is the same as usual despite a decided difference in the appearance of some sponges in the trough. Much will depend on the amount of yeast used in relation to sponge fermentation time. The only general statement that can be made is that the fermentation time will not be longer.

Mixing Requirements

Fortunately, the evaluation of gluten strength and dough development characteristics by the mill and baking laboratories now includes mechanical dough testing equipment, such as the Brabender farinograph and Swanson recording dough mixer. With these available, it has been relatively simple for the cereal chemist and baking technologist to rec-

Do you expect enough from your trucks?

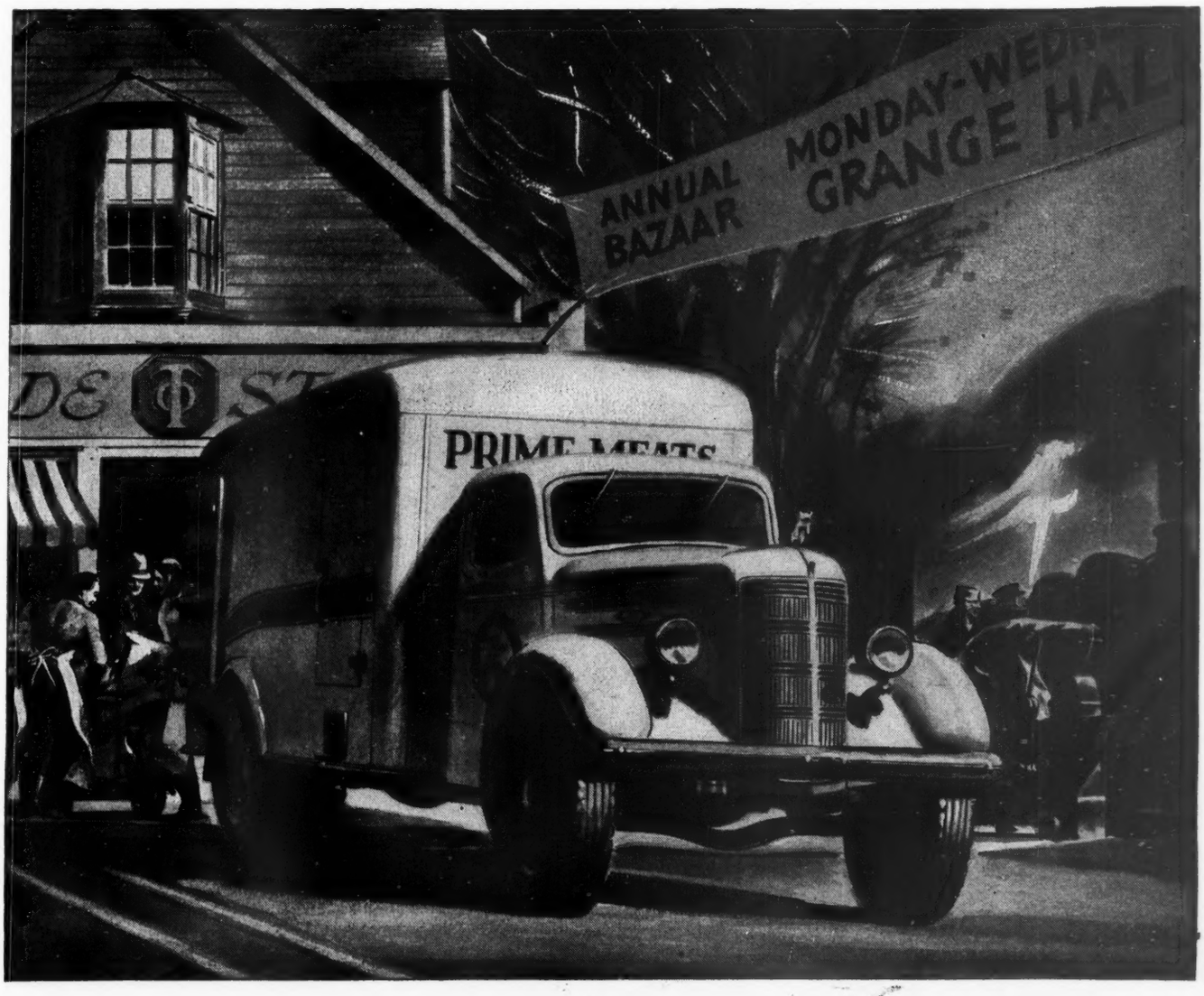
Now that the new ones are becoming available, it's time to take a fresh look at your basic conceptions about trucks.

Did it ever occur to you—you may be setting your sights *too low?*

Unless you use a Mack, you don't realize what an amazing performance a really tough truck can deliver, how hard it can work, how long, how economically.

Unless your standards of truck performance are based on Macks, you're probably putting up with less than you *could* get, and doing yourself out of cold cash.

Get hard-boiled about trucks. Get a truck that earns its keep—a Mack. Macks are products of 45 years of experience in building trucks that deliver more work per dollar of investment. That's why they're made with tetrapoid instead of conventional gears; with rubber Shock Insulators instead of ordinary spring shackles; with liberal use of heat-treated steel alloys. When you build a truck that way, though it costs a little more at first, *it costs a lot less in the end.*



Mack Trucks, Inc., Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N.Y. Factory branches and dealers in all principal cities for service and parts.

Mack
TRUCKS
FOR EVERY PURPOSE

Performance Counts!

IF YOUR WIRE CLOTH NEEDS ARE SUITED TO...

"BUFFALO" STAINLESS STEEL WIRE CLOTH

YOU'LL BE FAR AHEAD ON COSTS AND PERFORMANCE

"Buffalo" Stainless Steel Wire Cloth has brought new economy and efficiency to thousands of installations where cloths of other metals and alloys were formerly used.

Chief among the reasons are: higher tensile strength than ordinary steel, greater toughness, ability to withstand impact, freedom from rust or tarnish, retention of strength at high temperatures, resistance to abrasion and innumerable corrosive elements.

Most likely, "Buffalo" Stainless Steel wire cloth can do a job for you, too. Don't delay the possibilities. Act now by requesting FOLDER 596 for valuable data on corrosion resistance, effects of higher temperatures, use with other metals, mesh and wire sizes.

MANUFACTURER OF ALL KINDS OF WIRE CLOTH SINCE 1869

Buffalo WIRE WORKS CO., INC.

ESTABLISHED 1869 AS SCHEELER'S SONS

452 TERRACE BUFFALO 2, N. Y.

LEE BUILDS STANDARD KETTLES • • IN SIZES FOR EVERY PROCESSING NEED

Let LEE engineers work with you in developing the most practical, economical, standard or special equipment for your needs.

Bulletin on request.

LEE METAL PRODUCTS COMPANY, INC.

408 Pine Street, Philipsburg, Pa.

ognize changes in mixing requirements and different tolerances to mechanical development following the production of 80 percent extraction flours. Thus, the curve produced by the Brabender farinograph shows the 80 percent extraction flours of the spring wheat type developed slightly faster to maximum consistency and then break down rapidly to what could be troublesome stickiness in shop operation. There is, in general, less elasticity of the gluten and width of the curve is much narrower. Carefully prepared 80 percent extraction hard winter wheat flour shows little deviation in farinograph curve characteristics. If used 100 percent in the flour blend by the baker, little change in mixing requirements will be necessary. If some mills, however, use any kind of wheat that may be available, the 80 percent flours may reflect the presence of inferior wheat varieties in the mill mix.

Baking tests in the laboratory and practical tests in the plant support the recordings of the farinograph. Mixing time of straight doughs from spring wheat is 25 percent shorter to peak development. The flour and water of sponges mixes together rapidly and, while sponge mixing time is not normally a critical factor in bread production, it can be reduced slightly for best results.

The mixing requirements in the dough stage are definitely less to the extent of 20 percent to 25 percent. Thus, if a complete mixing time has been 10 minutes, it will be found necessary to reduce it to eight minutes for best dough handling properties. As to changes in mixing, necessary in any individual shop, much will depend on previous practice. In some cases, a reduction in mixing time may improve the bread. If the dough has been mixed on the long side in other bakeries, where mixing time has been short, a reduction may not be necessary. This change alone will not produce a loaf of maximum qualities obtained from any one brand or type of 80 percent extraction flour. Adjustments in yeast food, fermentation time and yeast must be carefully made, for the action of these variable factors is closely related to the development of the dough during mixing time.

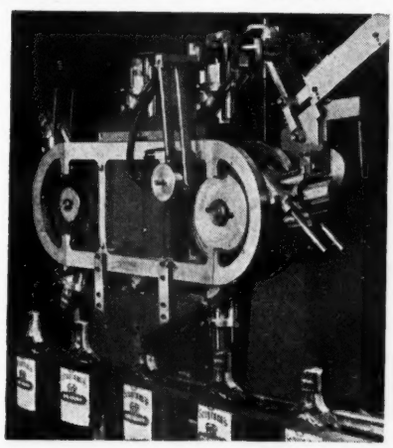
Vitamin Content Higher

The new flours will be higher in natural vitamin content, particularly thiamine, in addition to containing larger quantities of other factors of the B-complex not included in the requirements of the enrichment of flour or bread program. With flours

JUST OUT! 3 NEW WRIGHT MACHINES

- Wright's Automatic introduced three new, non-related automatic machines at the Annual Packaging Exposition in Atlantic City this month.
- Preliminary tests indicate that each machine probably can be adapted for use by other than the specific industry for which it was designed.
- Inquiries are invited, therefore, both from companies which obviously can use the machines and from all others for whom the machines might be adapted.

CELLULOSE BANDING

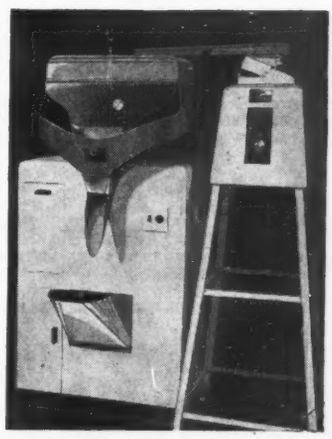


Close-up view of cellulose banding machine, minus guards, applying contractible cellulose bands to neck of liquor bottles over revenue strip stamp.

Hy-Tra-Lec Weigher

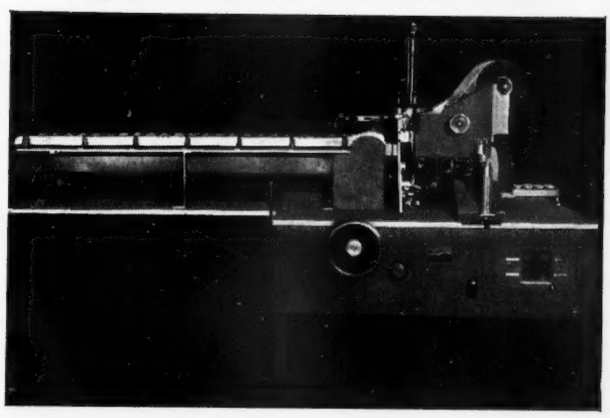
•

Weighs and discharges free flowing and non-free flowing materials at pre-determined net weights. Provides a degree of accuracy at high speeds previously unattainable. Machine pictured was designed for potato chip industry.



Hy-Tra-Lec employs a new principle of weighing which promises to have wide utility wherever accuracy and speed are essential.

MAY-PLEX WRAPPER



1. Wraps standard 5c packs of cracker type sandwiches in cellophane without use of cardboard support. 2. Heat seals the wrap. 3. Applies and seals labels to one or both ends.

Look to

WRIGHT'S *Automatic Machinery Company*

Durham, North Carolina
Established 1893

FOR NEW ADVANCES IN AUTOMATIC MACHINERY

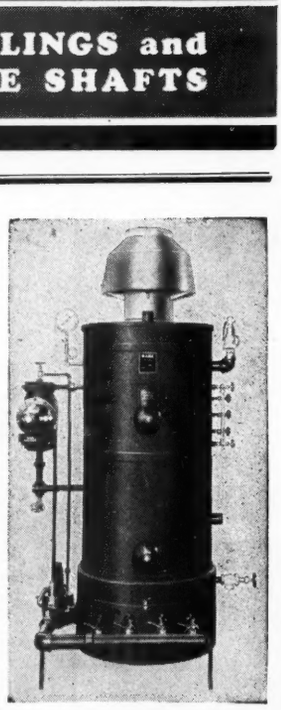
MORFLEX COUPLINGS
need no lubrication

Morflex couplings operate entirely without lubrication. No oil or grease to throw off and soil or contaminate. Special rubber trunnion biscuits permit some misalignment, cushion shock, isolate vibration, smooth operation. No metal-to-metal contact. Sizes from 2" to 12" diameter for various capacities.

MORSE CHAIN CO. • Detroit 8, Mich. • Ithaca, N.Y.
A Borg-Warner Industry

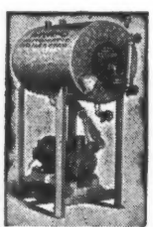
MORSE COUPLINGS and DRIVE SHAFTS

ENGINEERED STEAM



Throughout forty years' experience, we have met numerous problems in steam engineering; their solution has helped determine the design and construction of the modern KANE, automatic, gas-fired, steam boiler, built in sizes up to 30 H.P.

The KANE, in combination with the MKO automatic boiler feed and condensate return system, constitutes a complete *Engineered Steam* supply, flexible enough to fit in readily with your installation requirments.



Condensate Return System automatically returns hot condensate and adds needed make-up water.

Efficiently applied to a wide variety of plants in the food processing industry, this system is furnishing steam of maximum cleanliness with precise temperature control.

The KANE boiler complies with all A.S.M.E. Standards; built-in durability insures long life under hard usage. Under present conditions we can't supply all the demands for *Engineered Steam*, however, we will try to take care of your most urgent needs as soon as posible.

MEAD-KANE OFFICE
Manufacturers of Automatic Steam Boilers for over a third of a century
1903-1915 EAST HAGERT STREET, PHILADELPHIA

ranging in ash from .53 to .90 percent, it is easy to anticipate there will be considerable confusion in establishing an average vitamin content of the 80 percent extraction flours. The best milled flours of this type must be used as a basis for establishing the vitamin content and not the average findings of various laboratories, for this may include results of determinations of many flours of inferior quality for 80 percent extraction.

The experience of the British with the 80 percent extraction flour is a guide as to what can be expected as to the vitamin content. This is as follows:

Thiamine	1.09 mgs. per lb.
Riboflavin	.39 mgs. per lb.
Iron	7.5 mgs. per lb.
Niacin	7.2 mgs. per lb.

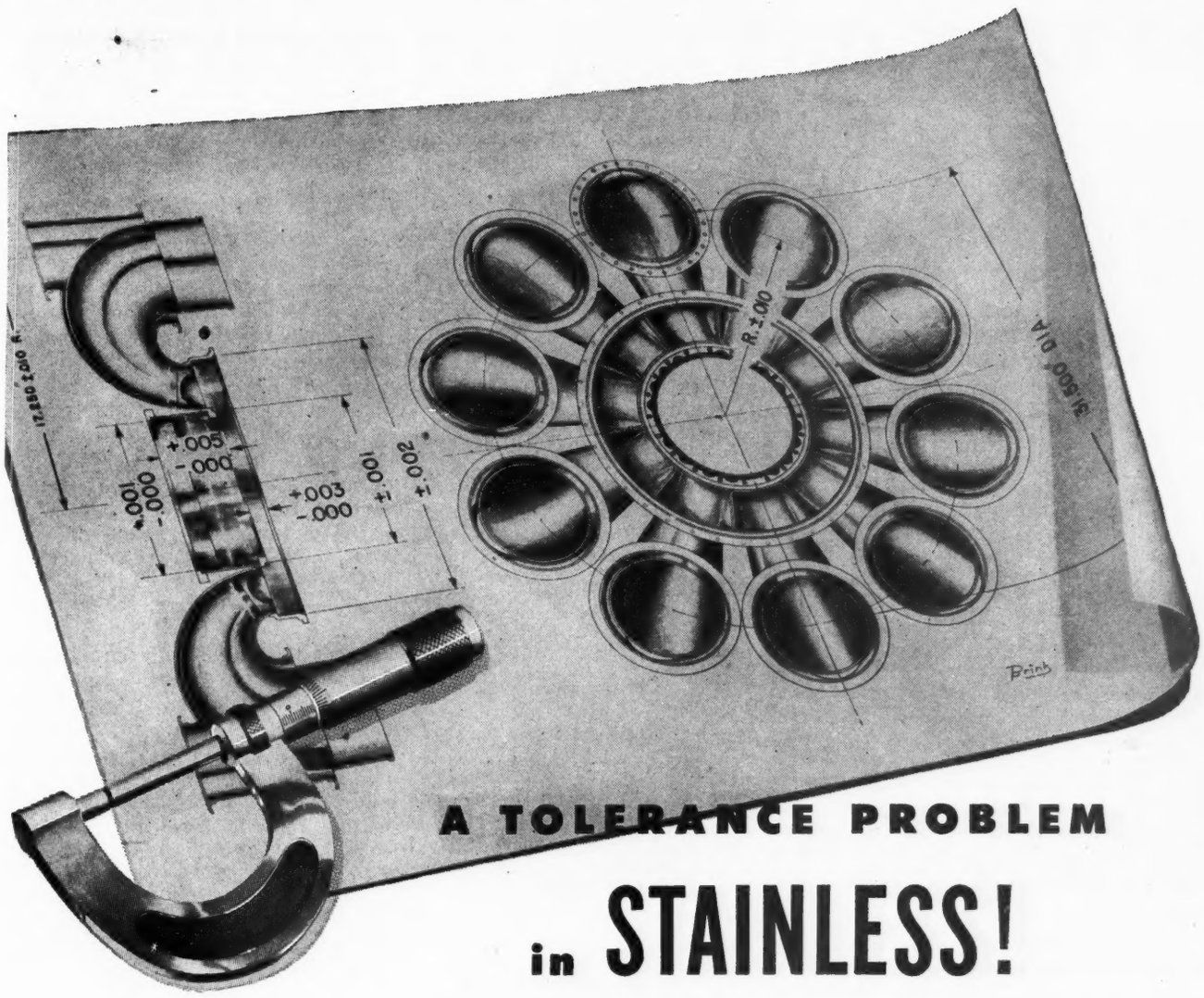
It would be a serious mistake for the baker to make any adjustments in his present program of enrichment of bread until such groups as the Millers National Federation and the American Institute of Baking, working closely with the Federal Food and Drug Administration, agree on what is an average vitamin and iron content in the 80 percent extraction flours.

Sweet Yeast-Raised Goods

What has been said of 80 percent extraction flours in connection with bread production applies to the sweet yeast-raised doughs as well. There will be a minimum of disruption in quality when proper adjustments are made. It is well to emphasize one factor—that if no yeast food has been used in the sweet goods formula the possibility of adding a small quantity to correct for greater proteolytic activity should be given serious consideration.

Cakes and Cookies

Not enough samples of soft winter wheat flour of 80 percent extraction have been examined to warrant any statements as to the ultimate effect of this type flour on the quality of cakes and cookies. There will be no clear flours which, as shown in the chart, are the long extraction, higher ash mill streams removed from the straight grade or 100 percent flours in the production of the shorter patent flour. This will present new problems to the bakers of hearth bread such as Vienna, French and Rye. The best solution will be to use the highest quality 80 percent extraction flours milled from spring wheat that can be obtained. These, plus some bromate or more yeast food, will keep to a minimum the softness and stickiness of sponges



A TOLERANCE PROBLEM in STAINLESS!

JET ENGINES ARE HARD TO MAKE

Specifications called for this stainless sheet metal elbow assembly. Notice the indicated tolerances! A tough job in any sheet metal—a terrific undertaking in stainless steel!

BUT SOLAR TACKLES ANY STAINLESS JOB

Utilizing the exclusive SOL-A-DIE process of forming and Solar's own specially developed welding, fitting and processing techniques, Solar's engineers and craftsmen maintained these exacting tolerances under successive production contracts.

SO IF YOU HAVE A TOUGH PROBLEM . . .

which involves combating corrosion or heat—consider stainless steel. Put it up to SOLAR engineering and production skill. Our nearest office is ready *right now* to help you tailor stainless steel to your special needs.

SOLAR
AIRCRAFT COMPANY

SAN DIEGO 12, CALIFORNIA : DES MOINES 6, IOWA : 60 E. 42ND STREET, NEW YORK 17, N. Y.

keep quality HIGH . . .

and bacteria count LOW with

LO-BAX*

Bacteria are always lying in wait . . . ready to contaminate foodstuffs and affect product purity unless all plant equipment is kept scrupulously clean and sanitary.

Lo-Bax, the concentrated, fast-killing chlorine bactericide, helps prevent food spoilage, improves quality standards by rigidly controlling bacteria, keeping down mold and sanitizing all surfaces with which food or beverages come in contact.

Simple and easy to handle—Lo-Bax kills bacteria almost instantly on contact . . . and at amazingly low cost. Dissolves quickly in water—hot or cold, hard or soft—to make clear chlorine-rinse solutions. Lo-Bax, with its 50% available chlorine, is dependable—retains its strength as packed in original container.

Let Lo-Bax help you maintain high quality standards. Write for free information on the many uses of this fast-killing bactericide.

THE MATHIESON ALKALI WORKS (INC.)
60 East 42nd Street, New York 17, N. Y.

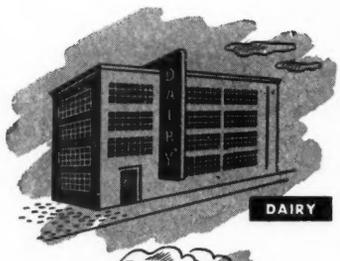
***LO-BAX**
50% AVAILABLE CHLORINE

LO-BAX SPECIAL—a superior chlorine bactericide in granular form—packed in 2⅓-lb. bottles, ½ doz. to the case; and in 14-oz. bottles, 1 doz. to the case.

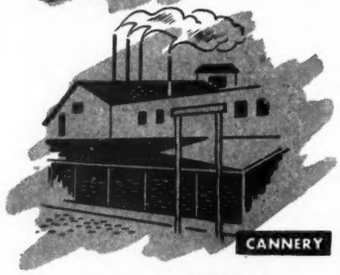
LO-BAX POWDER—a highly efficient chlorine bactericide packed in 1¾-lb. bottles, 1 doz. to the case.

Mathieson
LO-BAX
CHLORINE BACTERICIDE

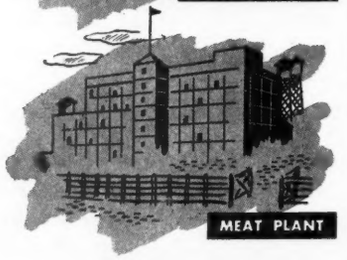
Lo-Bax • Super-Nufos • HTH-15 • Dry Ice • Carbonic Gas • Ammonia, Anhydrous & Aqua • Caustic Soda • Soda Ash • Bicarbonate of Soda • Liquid Chlorine • Chlorine Dioxide • PH-Plus • Synthetic Salt Cake • Sodium Chlorite Products • Sodium Methylate

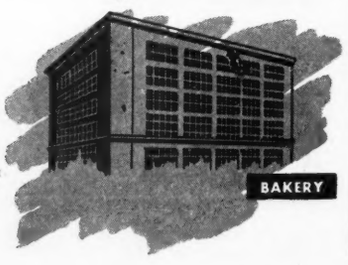


DAIRY


CANNERY

BOTTLING PLANT


MEAT PLANT


BAKERY

and reduce the pronounced tendency for the dough to run flat during proofing and in the oven. Some of the poorer milled 80 percent flours will be a serious problem for production of quality hearth bread and rolls.

High Quality Expected

When the mills have adjusted themselves to the production of the 80 percent extraction flour and the free access to wheat enables them to select wheat of proven quality, the baker will have a basic raw material of surprisingly high quality to challenge his ability. Such a flour, properly handled, will produce bread of normal volume, excellent grain and texture, fully equal to that obtained with the previous extraction flour. The crumb color, of which much has been said before much bread was produced, will not be black, or brown, or ecru. It will be darker but on a creamier tinge. Tests have shown that, without a direct comparison, the public will never notice the difference. Indeed, even with such comparison it will be difficult for the average person to tell the new bread from the old. Keeping qualities will be fine, equal to bread produced from the shorter extraction flours, provided the flours are developed to their maximum capabilities. Only when poorly milled 80 percent extraction flours are used will bread quality suffer.

All these qualities in the new bread are a tribute to the application of quality control of the highest order to the production problems of the milling and baking industry.

—End—

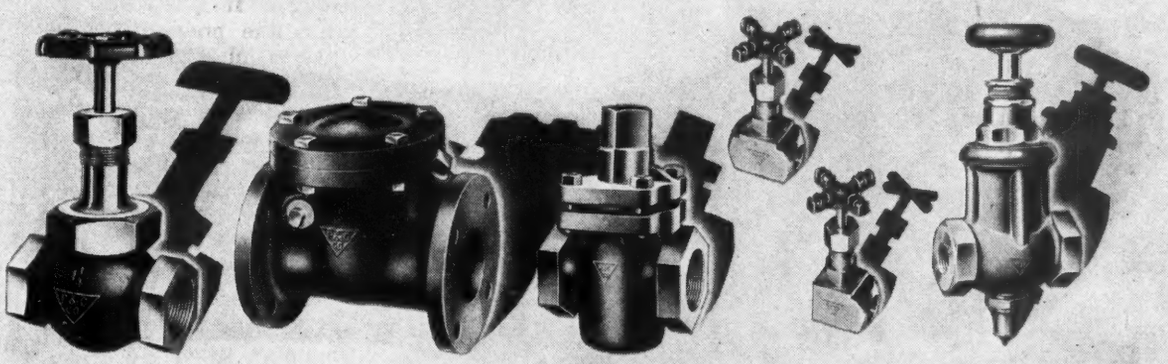
Milling "80" Flour

(*Continued from page* 79)

Tests show that the coarse "feedy" particles of the flour do require more maturing agent than do the finer particles of the flour, in some cases as much as 50 percent more. What to do about bleaching is still an "open" question. Bleaching can be overdone with this new flour as was possible with the old. As yet, no degree of bleach has been found that will remove the color from the bran particles in the 80 percent extraction flour. Use of malted wheat flour to obtain flour of desired diastatic activity has been cut to some extent. Heavier grinding throughout the mill to make possible the increased extraction of flour has given the new flour characteristics which permit reduction in use of malted wheat. Thus far there is no indication that

THE WAY TO BETTER VALVES

READING-PRATT & CADY



Globe Valve—with renewable slip-on disc—patented by Pratt & Cady.

Swing Check—patented by Pratt & Cady.

Asbestos-Packed Cock—introduced in U. S. by Pratt & Cady.

Bar Stock Globe and Angle Valves—originated by Reading-Pratt & Cady.

Piston Internal Pilot Controlled Automatic Regulating Valve—originated by d'Este.

During the last century, when the now ordinary valve types were being originated and patented, Pratt and Cady contributed, among others, such items as the slip-on disc for globe valves and the swing type of check valves. d'Este originated the piston internal pilot controlled regulator. This activity continuing to present times is illustrated by the bar stock valves originated by Reading-Pratt and Cady.

And when early in this century, a need developed for a valve material other than brass and iron and the available steel castings proved inadequate, Reading specialized and pioneered in the development of the art of producing steel pressure castings. That development has been continuous, particularly as the requirement for alloy steels has appeared and increased.

The way to better valves is to continue development.

Reading Cast Steel Valves and Fittings • Pratt & Cady Brass and Iron Valves
d'Este Automatic Regulating Valves
READING-PRATT & CADY DISTRIBUTORS IN PRINCIPAL CITIES

ACCO

Reading, Pa. • Atlanta • Chicago • Denver • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh • Portland • San Francisco • Bridgeport, Conn.

TRADE MARK

READING-PRATT & CADY DIVISION
AMERICAN CHAIN & CABLE

THE WEST WAY... IS THE BEST WAY

To Maintain Healthfully Clean Washrooms

To supplement the regular duties of your janitors, *specially trained West Service Men,* experienced in using proper disinfecting and deodorizing materials in the most efficient manner, inspect and service your washrooms on a regular periodic schedule. The cost is surprisingly low. Your purchase of Westamine, the *odorless* disinfectant, West Bowl Cleaner and West Deodorants INCLUDES THE SERVICES OF THESE WEST SERVICE MEN WITHOUT ADDITIONAL CHARGE!

• *Write for new descriptive booklet.*

"A WASHROOM MAINTENANCE SERVICE"

WEST DISINFECTING *Company*

42-16 WEST ST. • LONG ISLAND CITY 1 • N. Y. • DEPT. F

all the malted wheat can be eliminated. What further tests will show remains to be determined. Since the vitamin content is increased in the new flour through inclusion of some germ-stocks, bran and other "feed" portions of the wheat berry, addition of different strength enrichment materials to meet established standards will eventually be possible. But, until reliable and average vitamin assays are available, continuation of enrichment on the old basis will be necessary.

Not all the problems that the 80 percent extraction flour has inflicted upon the wheat millers have been examined. Many new ones will, without doubt, turn up as wheat millers adjust their practices and methods to meet the requirements of WFO 144. One of these problems is already becoming quite prominent. It is that of wheat selection.

A technological reason for the adoption of a 72 to 75 percent extraction method for making flour has been the variations in endosperm content of wheats. Millers learned through experience and experiment that extraction of 72 to 75 percent of the wheat berry assured a minimum of germ and bran contamination. Although extractions of 80 to 85 percent or even higher are possible, the job of getting flour free from germ and bran contamination becomes increasingly difficult above 72 percent. In milling 72 to 75 percent extraction, the miller has an 8 to 13 percent factor of safety to give him uniformity in appearance and in the baking properties of the flour.

Factors in Wheat Selection

An important factor in selection of wheat is the variety of the wheat and the size of the wheat berries. A plump wheat berry with a thin bran coat will mill a better flour of 80 percent extraction than will a lean berry with a heavy bran coat. Wheats known to have poor milling properties and to make flour with poor baking qualities become even more objectionable than they were for making flour of 72 percent extraction.

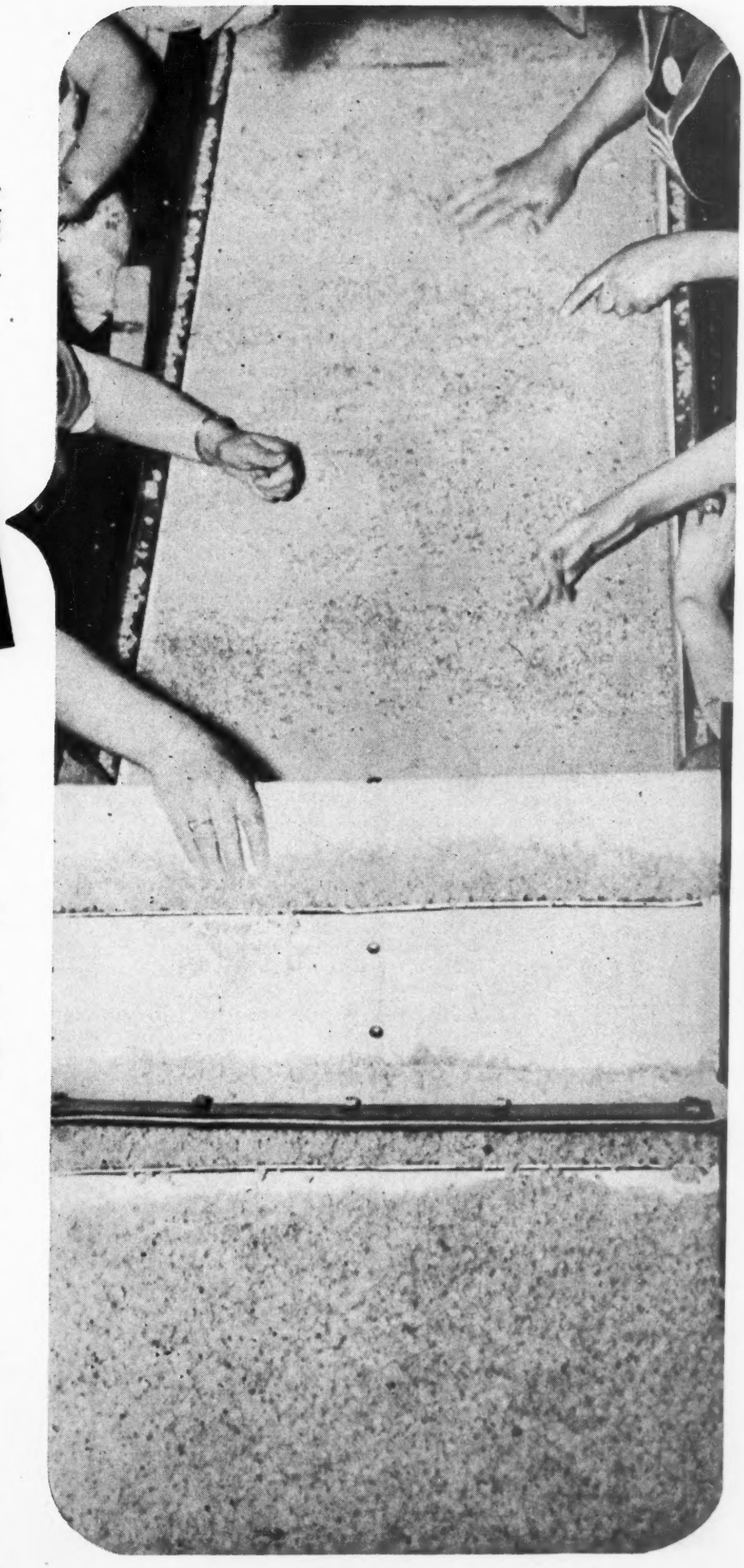
These complications mean that control over and grading of incoming wheat become increasingly important for the production of a uniform flour, as well as for profitable mill operation. Also, quality control supervision over milling operations becomes even more important than it was under previous conditions of mill operation. Small mills with a short milling system and without well-trained and experienced personnel, in both the production and con-

Food and canning plants prefer Globe Kanry-Tex Conveyor Belting because it meets ALL their needs!

Globe Kanry-Tex is strong, durable, economical.

Here are its features:

GLOBE KANRY-TEX
...meets the needs of Canneries and Food Plants...



Globe Kanry-Tex resists moisture, alkali, fats, oils. It is sanitary, easily washable with hot water, live steam, or sterilizing agents. It is also long lasting, and does not impart odor or taste!

With minimum care, Kanry-Tex presents a clean, sanitary appearance during its entire life.

All these features stem from the manufacture of Globe. This belting is a solid woven cotton belt, thoroughly impregnated and coated to resist agents that normally deteriorate ordinary conveyor belts.

You will profit by using Gobe Kanry-Tex conveyor belting. Write today for details, or contact your mill supply house directly.

GLOBE
WOVEN BELTING CO.
1396-1400 CLINTON ST.
BUFFALO, N. Y.

KILLS PLANT MAINTENANCE ENEMIES

Damp-Tex super-enamel can be applied to surfaces despite moisture, heat, fumes and many other extreme conditions. Its water-proof film retards deterioration, increases efficiency, turns depressing, dingy interiors into gleaming, porcelain-smooth beauty. Resistant to fungus, 2% caustic solution, steam and lactic acid. One coat covers. Comes in white and colors. Used in over 4000 plants. Write for our trial offer.

Proved Fungus Resistant by FUNGUS TEST

Proved Lactic Acid Resistant by ACID TEST

LIQUID PORCELAIN-LIKE DAMP-TEX FOR WET OR DRY SURFACES

STEELCOTE MFG. CO.
ST. LOUIS 3, MO.

Canadian Manufacturer:
Standard Paint & Varnish Co.,
Windsor, Canada

trol departments, will find it hard to compete with the larger and more progressive millers who have the technological "know how." Milling of wheat to 80 percent extraction is no picnic for any miller who desires to make a uniformly good quality flour and to do a good job of mill operation. Those mills that operate under laboratory control and with technically trained personnel will have the least difficulty in meeting the new requirements and at the same time making a reasonably satisfactory flour.

What is meant by a "reasonably satisfactory flour?" What does it look like? What can be done with it? Millers have been besieged by these and similar questions by apprehensive customers.

Flour Is Slightly Darker

When the flour of 80 percent extraction is milled as we have outlined, it is only slightly darker in color. Unless placed side by side for direct comparison, the change in color is difficult to detect by other than experienced observers. Performance in the bake-shop will not differ greatly from that of flour of 72 to 75 percent extraction.

The bread baker finds that the 80 percent flour requires about 10 to 15 percent less mixing time and that it requires about 1 percent less water to make doughs of equal consistency. Otherwise, doughs made from the new flour will behave normally. Fermentation tolerance of the doughs is slightly lower. That difference in fermentation tolerance might be offset by the making of smaller dough mixes. The baked loaf has a pleasing appearance externally although the loaf volume will be about 5 to 10 percent less. Internally, the loaf has a slightly coarser crumb and a slightly duller color than does bread made from flour of 72 to 75 percent extraction. On no basis can the crumb of the bread made from flour of 80 percent extraction be described as being "brown" or even "dark."

Cakes made with 80 percent extraction soft wheat flour have exceeded expectations thus far. Angel food and white layer cakes are not as white in appearance as before. Yellow layer, pound, and devil's food cakes are highly satisfactory. True, they do not possess the silky texture of those made from the former type flour, but they are similar enough in quality to appease the "sweet tooth" of the cake lover. The noticeable differences in cakes made with the two types of flour are that cakes made with flour of 80 percent extraction have slightly coarser crumb, have slightly more volume, and have slightly poorer keeping quality.

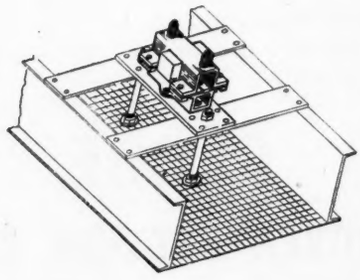
Both bread and cakes made from the 80 percent extraction flour exhibit a tendency to stale more quickly than those made with the flour previously used. This tendency towards rapid staling may be partly overcome as millers and bakers become more experienced in the making and the using of the 80 percent extraction flours.

Making of doughnuts, coffee cakes, sweet rolls, pies, biscuits and similar bakery products is practical with the new flour. Adjustments in formulas and bake-shop practice will be necessary in many cases.

In overcoming the various difficulties in the using of the 80 percent extraction flours, the art of baking becomes more and more dependent upon the science of baking, just as the flour miller had to rely upon the technology of wheat milling to change his mill over to the making of the new flour. In both instances, experimental data, technical knowledge and artisan skill are combined in arduous application for the solution of the problems pertinent to the making of the best product possible from a not-too-different raw or ingredient material.

LIVEN UP SCREENING SURFACES

APPLY A SYNTRON "Pulsating Magnet" SURFACES



and watch the fines go through!

Write for Folder No. 1-44

SYNTRON CO. 460 Lexington Ave. HOMER CITY, PA.